EVALUATION STUDY OF THE HIGH YIELDING VARIETIES PROGRAMME

Report for Rabi 1967-68—
Wheat, Paddy and Jowar

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PREFACE

A detailed evaluation study was carried out by the P.E.O. on the implementation of the High Yielding Varieties Programme during 1967-68. The report for the kharif season covering four crops *viz.* paddy, maize, bajra and jowar, was presented earlier. This report is based on the enquiry during the rabi season covering wheat, paddy and jowar crops. The first part of the report relates to wheat and the second part to paddy and jowar crops. Detailed statistical tables are presented in the appendix.

The study for wheat was carried out in fifteen districts of six major wheat growing States with a sample of 441 participants and 192 non-participants. The study for paddy and jowar was conducted in fourteen districts (10 for paddy, 4 for jowar) in eight States. The selected block was the same as in the kharif season; but this season's enquiry was confined only to those blocks where the coverage of area in terms of targets fixed was significant. In order to collect complete and accurate data, the study was carried out in three rounds of field visits to the selected areas and cultivators as in the earlier kharif season. The aspects covered in the study included planning, programming, organisation of supplies and credit, extent of adoption of various recommended improved practices and inputs, cultivation expenses, levels of yields, extent of acceptance of the high yielding varieties among the cultivators and the problems faced in adoption.

The high yielding wheat varieties have proved their potential at the field level as evidenced by the widespread adoption of these varieties by the farmers in the relevant States. This favourable turn of events needs to be sustained. A number of problems are yet to be satisfactorily resolved in order to ensure both quantitative expansion and qualitative improvement of the contents of the programme. The performance of the new varieties of paddy and jowar during the season was comparatively better than the kharif season. A number of favourable factors responsible for this performance have been brought out in the appropriate parts of the report. It is for the authorities concerned to take note of the various findings and suggestions so that the full potentialities, specially of paddy and jowar varieties in the rabi season are taken advantage of in future programming. It is hoped that this report will be found useful by all concerned.

We received valuable coöperation, guidance and assistance in the conduct of the study from a number of official and non-official agencies including the selected cultivators, which we gratefully acknowledge.

This report has been prepared by the analysts in the Agriculture Economics Division of the P.E.O.

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BRIEF SUMMARY

This report is based on the data collected during rabi 1967-68 for wheat, paddy and jowar crops. The objectives, design and methodology of field investigation followed were the same as in the kharif season. The study for wheat was carried out in 15 districts and as many blocks in 6 States and a sample of 441 participants and 192 non-participants in 45 selected villages was drawn for collection of detailed data. There was no participant cultivator in the three selected villages of Ahmednagar district, Maharashtra and hence data from the non-participants only was collected and analysed. For paddy the study could be conducted in 10 out of 22 selected blocks of kharif season while for jowar 4 of the selected blocks (three in Maharashtra and one in Mysore) were retained.

I *Wheat*

1. *The New Strategy and the technical aspects of the Programme* :

The introduction of Mexican wheat varieties gave a new hope for wheat cultivation. The release of P.V. 18, S-227 and S-308 during rabi 1967-68 somewhat eclipsed the earlier introduced varieties by their extremely good performance. There is already a talk of 'Triple dwarf' variety. Along with these varieties, K-68, an indigenous variety evolved in U.P. was also recognised as a high yielder. All these varieties were adopted by the cultivators to some extent in all the relevant States except in Bihar where the recently released varieties were not yet popular and in Maharashtra where the climatic conditions were reported to be not suitable for mexican varieties and hence the response was quite poor.

The new wheat varieties, unlike the other high yielding and hybrid crops, are reported to be less susceptible to pests/diseases, thus enhancing their acceptability. Because these varieties are relatively of shorter duration, slightly delayed sowing is necessary with consequent adjustments in the existing cropping pattern. Irrigation at crucial stages of crop growth has to be ensured to achieve the best results. It is stressed that all the package of practices including plant protection, inter-culture and application of chemical fertilisers should be adhered in order to derive the maximum benefits from these varieties.

2. *Demonstration Programme, Training and Extension Personnel* :

Trials/demonstrations were expected to precede the large scale release of new varieties. But the number of demonstrations conducted in the selected areas was quite less and the programme was significantly extended during rabi 1966-67 only. In more than half the selected villages, no demonstrations had been organised. The spread of the high yielding varieties in terms of area coverage had been quite rapid but the more important aspect of the acceptance of recommended package of practices to achieve the promised high yields call for extensive trials/demonstrations.

The strengthening of the block agricultural extension staff was contemplated in the programme areas in the context of H.V.P. and in the selected areas such expansion, particularly in the strengthening of agricultural extension officers and VLWs, was observed. The frequency of their transfers during the period also recorded a decline indicating minimum disturbance of staff in the interest of better implementation of the programme. However, the training programme for both officials and cultivators appear to have slackened during the current rabi compared to the earlier season. The rapid expansion of the programme does not warrant such slackening of efforts in this direction. The coverage of villages by visits from the extension staff was quite satisfactory.

3. *Spread of the high yielding wheat varieties* :

A considerable section of the cultivators, particularly in Punjab, Haryana and U.P. adopted the high yielding varieties. The organisational and promotional efforts made by the administrative and extension functionaries were appreciable in the selected areas. The administration at the district and block levels had been fully geared to meet the mounting demands of this programme. The targets initially fixed were progressively revised upwards as the season progressed without consulting the local functionaries. But thanks to the progressive as well as average cultivators, even the revised high targets had been over-fulfilled by natural spread among the cultivators who were fully convinced of the superiority of these varieties.

4. *Arrangements for supply of inputs* :

(a) *Improved seed* :

One of the most extraordinary features of the current rabi was the clamour for the latest varieties of wheat seed by the cultivators. The seed supplied by official agencies constituted only a fraction of the total supplies and the bulk of the sowings were accounted by natural spread among the cultivators themselves. The distribution of seed through the cooperatives was reported to have not functioned satisfactorily, particularly in Haryana, and the department had to get this role re-transferred to itself. The purchase of seed was mainly on cash/credit basis and only a fourth of the cases were on exchange basis. In more than 95 p.c. of the cases, seed supplied by the departmental agencies was treated seed while such seed treatment was far less than half of the cases of seed supplied from 'other cultivators'. Thus, there is need for extending the facilities of processing the seed at nominal charges for the local cultivators also.

(b) *Supply of credit* :

The policy regarding the liberalisation, enhancement of credit limits, etc. were more or less the same as in kharif season. The extent of disbursement of credit witnessed significant improvement during the current rabi compared to the previous season and there was eightfold increase in the number of cultivators benefitted by cooperative credit. Among the selected participants about two-thirds reported membership in the cooperatives and this proportion was less than a quarter in Bihar and Rajasthan only. The number borrowing for growing high yielding crop from various agencies increased five-fold and the amount borrowed recorded an increase by 9 times over the previous rabi season. The main source of credit was cooperatives followed by the block agency. Thus, the special measures taken by the Government and the institutions to cater to the full credit needs of the programme were quite successful. Compared to 71.8 p.c. of the total credit disbursed for H.Y.V.P. in kind during last rabi, 91.4 p.c. of the credit during the current season was in kind. In view of the heavy cash expenditure to be incurred in the cultivation of these varieties, the kind component need be limited to 50 to 60 per cent in this context and the remaining given in cash.

5. *The Participants and Area Coverage* :

More than two-fifths of the wheat cultivators adopted the high yielding varieties in the current rabi and the extent of adoption was generally encouraging among all classes of cultivators. The VLW was reported to be the main agency for inducing the cultivators to take up these varieties, followed by progressive cultivators to whose efforts were significant particularly in Punjab and Haryana. Only about 5 per cent of the participants were influenced by trials/demonstrations. The demonstration programme appeared to have started when the H.Y.V. programme was already under implementation. But compared to last rabi, the programme appeared to have slackened during current rabi and it needs no emphasis that demonstration is the most powerful tool to educate the cultivators in the recommended package of practices to achieve good results.

About 62.2 per cent of the selected participants adopted the high yielding wheat varieties for the first time during the current season only while about 36 per cent adopted the same during the last rabi. For the selected respondents, the area under the high yielding varieties increased from a mere 11.7 acres in 1965-66 to 296.8 acres during the last rabi and to 1421.1 acres during the current season. The average area under the varieties during the current season worked out to 3.07 acres per participant and this average ranged from 0.46 acres for the smaller cultivators to 10.69 acres for the bigger cultivators. But the proportion of cropped area covered under the H.Y. varieties was almost of the same order for participants in all groups according to size of holdings.

6. *Adoption of recommended practices* :

The cultivation of the high yielding wheat varieties imply conscious adoption of recommended practices to achieve the best results. These practices are recommended at each stage of crop growth or agricultural operation. The preparatory ploughing was observed to be generally satisfactory and the proportion of plots having adequate number of ploughings worked out to more than half and upto three-fourths of the relevant plots in all the States except in Bihar where this propotion was slightly more than a tenth only. The application of basal dose of fertilisers was reported by about four-fifths of the participants. The basal dose of nitrogenous fertilisers was reported for 73.5 p.c. of the plots and the dose applied was on an average 73.6 kg. of Ammonium Sulphate. The phosphatic fertilisers were applied in 53 p.c. of the plots at an average dose of 115 kg. of Super-phosphate against the recommended dose of 125 to 150 kg. However, in the case of potassic types, the recommendation was not uniform and in many cases it was optional. The application of this fertiliser was found on a significant scale in U.P. (47 p.c. of the plots) and Punjab (16 p.c. of the plots) only.

The recommended range of seed rate was reported for about 71 per cent of the sowings while in the case of 26 per cent of them, the seed rate was below the recommended range. The depth of sowing and the distance between rows were also observed to be as per recommendations in more than nine-tenths of the sowings. But the adoption of plant protection measures was very meagre in all the selected areas. Interculture operations were reported for 86 per cent of the plots and in 57 per cent of the plots hoeing was reportedly done. Top-dressing with nitrogenous fertilisers was reported for 81 per cent of the plots and the average dose applied was 91 kg. of Ammonium Sulphate. In respect of all these operations, Bihar lagged behind the other States.

Irrigation and water management are the important aspects of the cultivation of these varieties. Almost all the relevant plots were irrigated but the proportion of plots given the recommended minimum of 5 irrigations or more came to 35.8 per cent only and this proportion was much less in U.P. and Bihar. The lesser number of irrigations might have been to some extent due to timely rain. For 91.2 per cent of the plots sufficient irrigation was reported and this proportion was less than 90 per cent in Rajasthan where the only source available was canals. There appears to be scope to improve water practices through better organisation and management of the large public sources.

7. *Cultivation expenses* :

The average cash expenditure incurred by sample participants on the inputs per acre for the high yielding wheat varieties worked out to Rs. 245, seven times such expenditure for other than the high yielding crops (Rs. 35). Of the cash expenditure per acre for H.Y. wheat varieties, the major part was for chemical fertilisers (38 per cent) and labour (32 per cent). The expenditure on seed was also quite high at about 12 per cent, while the expenditure on plant protection measures was very low *i.e.* 0.56 per cent. Of the selected participants, about 56 per cent had incurred Rs. 200 or more on cash inputs per acre. It was broadly observable that the higher value of gross harvested produce was associated with the higher cash expenditure on inputs.

8. *Yield levels* :

The average yield per acre for the total harvests numbering to 699 for the high yielding wheat varieties of the selected participants worked out to 10.75 quintals. Yield up to 20 Q. or more was recorded in 24 cases including 4 cases where the yield was more than 30 Q. The average yield recorded increases to a certain extent with increased size of operational holding of the participants. 272 out of 441 selected participants raised local wheat varieties and the yields harvested per acre for these participants for high yielding wheat varieties averaged 11.23 Q. compared to 6.34 Q. for local varieties.

Regarding the yield levels of different high yielding wheat varieties, P. V-18 and S-227 appeared to be relatively better with an average yield of 16.43 Q. and 14.35 Q., respectively per acre, and their performance was uniformly good in all the relevant States. Lerma Rojo also had given good yields except for its poor average yield in Bihar. The yield for K-68 variety which was adopted in U.P. only was the least. Its relative performance was not satisfactory. The extent of attack of pests/diseases was about the same for all the varieties, but the extent of damage was relatively more for K-68 and Sonora varieties. Loss due to lodging was also reported to be relatively more for K-68 and Lerma Rojo varieties and due to shedding, for K-68, Sonora and Lerma Rojo varieties. On the whole, the performance of P.V.-18 and S-227 varieties was good while that of K-68 was disappointing.

9. *Extent of Acceptance of the varieties* :

Inadequate and untimely inputs supplies and credit facility were reported to be the main problems to be tackled as yet to facilitate wider adoption and coverage under these varieties. The problem of marketing of the produce was also reported from many areas. The performance of these varieties during the current rabi was reported to be quite satisfactory and about nine-tenths of the participants desired to continue their cultivation. The remaining one-tenth of the participants mainly belonging to U.P. and Rajasthan, wanted the discontinuance of the varieties mainly because of high cultivation costs and lack of local demand for the produce.

Among the selected non-participants also, about 90 per cent had the knowledge of these varieties and about three-fourths of them acknowledged the higher yield potential of these varieties. The main reasons for their non-adoption of these varieties during the current rabi included lack of irrigation facilities and the problem of high costs of cultivation. But about three-fifths of these non-participants proposed adoption of the varieties from the next season, while the remaining were hesitant in view of higher costs of cultivation, lack of markets and lack of irrigation facilities. The wheat high yielders have proved their potential and convinced a large majority of the cultivators in all the relevant States. This favourable climate, both at the physical and psychological levels, has to be nurtured carefully and pursued assiduously.

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II. *Paddy and jowar* :

10. The H.V. Programme in the rabi season for both the paddy and jowar varieties was relatively more successful. Although the coverage of area was limited because of the constraints of irrigation, lack of rainfall, etc., the performance of the varieties during the rabi compared to the kharif, was very much better. Besides, the seasonal advantages, the efficiency in the organisation of input supplies and credit leading to better standards of cultivation seems to have contributed a great deal for the higher yields recorded in this season for all these varieties. The adoption of the recommended practices in the cultivation of both paddy and jowar varieties in terms of preparatory ploughing, application of chemical fertilisers, interculture operations, preventive plant protection measures, etc. was observed to be better in this season compared to the kharif. Adoption of these practices in combination was reported by a larger proportion of the participants in this season. The average cash expenditure per acre was also higher for this season compared to kharif. The average yield increase per acre for the selected participants was over 75 p.c. for high yielding paddy and more than 150 p.c. for hybrid jowar compared to the kharif season. Thus the foregoing analysis on the various aspects of the cultivation of these varieties clearly brings out the need for better exploitation of the potentiali-

ties of these varieties in the rabi season by an effective linkage of the programme to areas served by minor irrigation sources as well as areas enjoying canal irrigation during this season. Concentration of efforts in such areas rather than universalising the programme is bound to prove much more rewarding.

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MAIN REPORT

PART I—*Wheat Crop*

CHAPTER I

INTRODUCTION

1.1. During the agricultural year 1967-68, the P.E.O. carried out detailed evaluative studies on the High Yielding Varieties Programme in selected development blocks. Based on such investigations in 41 blocks during the kharif-1967 (covering paddy, bajra, jowar and maize), a report was brought out in August, 1968.

1.2. This study was continued during the Rabi season of 1967-68 also. principal crops covered in this season were wheat, paddy and the rid crops of bajra, maize and jowar. Wheat is the most important Rabi p in the northern and central regions. In Maharashtra also wheat is of ne importance during this season. In the southern and eastern States, pending upon the availability of irrigation water, a second crop of paddy cultivated to a limited extent. The sowing and harvesting periods of is second paddy crop widely vary as between these relevant States and is does not also strictly coincide with the 'Rabi' season as understood in he context of wheat cultivation in the North. There are also a variety of names given to these seasons in different States. In some cases the transplantation of paddy takes place as late as February, so much so, the harvests go on till the month of June. Since our intention was to study the cultivation of the second crop of paddy, such cases were also included.

1.3. The millet crops such as jowar, bajra and maize are the principal kharif crops in most of the relevant States. However, in Maharashtra, jowar is an important Rabi crop also. Similarly, bajra cultivation under irrigated conditions is also undertaken on a limited scale in Gujarat during the summer season. After the introduction of the hybrid varieties of maize. cultivation of this crop, more or less on an experimental basis in the Rabi season, has been taken up in Maharashtra and parts of U.P. and Bihar (Zaid season). Our study during the Rabi season was confined to the same blocks as were covered for the kharif for relevant crops *viz.* paddy, and jowar. The field investigations could be carried out only in 10 paddy blocks and 4 jowar blocks. In the remaining selected areas, the crop was not grown in this season.

1.4. The study of wheat was carried out in 15 districts and as many blocks in 6 States. Some of these districts in these States had also been studied during the kharif season either for paddy or the hybrid crops. A list of the sample areas chosen for wheat study may be seen in the Appendix. In terms of area cultivated now and the potential wheat crop offers for solving the food problem of this country, special attention needs to be given on the research and extension aspects of this crop during rabi season. Hence, we consider it more useful to analyse separately the data for this crop and present it as part I of this report. The problems of cultivation in regard to H.V. paddy and hybrid jowar have been dealt with in considerable details in one kharif report. The data for these crops studied during this season are briefly presented in Part II of this report.

The Design, objectives etc.

1.5. The objectives, design and methodology of field investigations followed for this season's study are the same as those for the kharif season. In the 15 sample blocks for wheat crop, 45 villages, 441 participants and 192 non-participants were selected. It is relevant to mention here that in Ahmednagar district of Maharashtra State, although the programme was relevant for this crop as targetted by the State Government, in the three sample villages of Kopargaon block, we did not come across even a single participant cultivator for the recognised high yielding varieties of wheat. Hence in the analysis of participant data, this State does not figure; but the data for non-participants in these villages are analysed. The problems faced in growing the recommended varieties in this State are discussed in the appropriate places.

1.6. The main approach to this new strategy in our agriculture, policy behind this programme, the administrative and organisational aspe the planning process, principles laid down for the selection of the ar and cultivators, preparation of a working programme according to a cal dar of events etc, were laid down for the agricultural year as a whole a these aspects have been fully discussed in our earlier kharif report. Broad our observations of this season in the wheat blocks were similar to tho mentioned in the kharif report in regard to the above mentioned aspect

1.7. The analysis in this report covers the following principal aspects o the programme :

(i) Technical aspects of the varieties popularised, their characteristics, trials and demonstrations, training of extension personnel and farmers;

(ii) Extent of spread, targets and achievements at various levels, land utilisation and proportion of H.V. areas to total cropped area, etc.

(iii) Supplies of inputs such as seed, fertilisers, pesticides and credit.

(iv) Knowledge and adoption of practices by participant cultivators, cultivation expenses and yields.

(v) Problems of non-participants, reasons for non-adoption etc. and

(vi) The role of registered growers in the programme.

Technical aspects of the programme :

1.8. The introduction of the Mexican varieties *viz.* Lerma Rojo and Sonora-64 was a significant land-mark in our agriculture. The basic element in this new technology is the dwarf nature of the exotic varieties enabling the application of a high dose of fertiliser with the consequent gain of a much higher yield compared to the hitherto available varieties of this crop. Since our utmost concern now is to substantially increase the per acre yield of the crop, the new seed varieties have opened up vast potentialities in that direction. To begin with, only two exotic varieties mentioned above were released for cultivation. Since the Rabi season of 1965-66 and up to the end of 1967-68 Rabi season quite a few other varieties have been added to the list of recognised varieties. Notable among these are S-227 and S-308 and P.V.-18 (also Mexican in origin) and K-68, indigenous high yielder evolved in U.P.

1.9. The release of P.V.-18, S-227 and S-308 for general cultivation during Rabi, 1967-68 somewhat eclipsed the earlier introduced Mexican varieties as there had shown much better performance in yields, besides their better grain quality. There is already the talk of the 'triple dwarf' variety. During this season, all these varieties were adopted by cultivators in the States of Punjab, Rajasthan, Haryana and U.P. whereas in Bihar the latterly introduced varieties had not yet reached the average cultivator. In Maharashtra, the Mexican varieties are said to be not quite suitable for the climatic conditions of the wheat growing tracts. Besides the farmers of that State did not like the quality of the grain.

1.10. Apart from the principal characteristic of the Mexican varieties *viz.* their dwarf stature, the most favourable characteristic of these is that they are less susceptible to pests/diseases. Compared to paddy and other hybrid varieties which are highly vulnerable to pests/diseases, the new wheat varieties have scored high thereby making themselves readily acceptable to the growers. In fact, our experience in regard to paddy and other hybrids had shown that severe pest attack was one of the principal deterrants for adoption in certain States particularly Orissa, West Bengal and Andhra Pradesh.

1.11. The response of the varieties is reported to be very high under irrigated conditions and therefore cultivation of these can be undertaken in irrigated areas. But irrigation has to be given in certain crucial stages of the growth of the wheat plant which alone can significantly add to the yields, other things being equal. For instance, irrigation at the crown-root initiation stage and then again at the flowering stage of the crop are said to substantially enhance the yields. The knowledge of such important practices seems to be somewhat imperative in their adoption.

1.12. The indigenous varieties of wheat are generally sown during October and early November. In view of the short duration of these dwarf varieties, a slightly delayed sowing, say the latter half of November, would prove more beneficial to crop growth and yields. This characteristic also necessitates slight adjustments in the cropping patterns. Besides, all the other package of practices such as use of treated seed, inter-culture, prophylactic measures of plant protection, application of recommended doses of fertilisers are all important in order to derive the maximum benefits.

1.13. We also examined in this study the extent of trials/demonstrations conducted in the selected areas since the inception of the programme, so as to test the suitability of these varieties in different tracts and also educate the cultivators on the various technical aspects mentioned above. The programme was officially launched for wheat during the Rabi season of 1965-66. Trials and demonstrations were expected to precede the large scale release of new varieties. Thus we obtained data from official records for two periods *viz.* (i) year before the introduction of the programme and (ii) 1966-67 Rabi. Full data were not yet available for the Rabi of 1967-68. These are presented in Appendix Table No. 1.1.

1.14. There was not much of an evidence that trials and demonstrations had been conducted on any perceptible scale in our sample blocks and villages. In three selected blocks of Punjab, one each of Haryana and Rajasthan, some 56 trials and demonstrations were reported to have preceded the launching of the programme. The position in the sample villages was still more disappointing as in only 3 villages, 5 such trials/demonstrations were held. However, the position improved remarkably during Rabi, 1966-67. There was a ten-fold increase in the number of such trials/demonstrations; even in our sample villages their number increased five-fold. But it has to be observed that while 14 out of 15 sample blocks had taken up this programme during 1966-67, only 19 out of the 45 sample villages had been covered by this programme even during the last year's Rabi.

1.15. The importance of the trials/demonstrations as an effective extension method needs no emphasis. We had observed in our kharif report that this was one of the weakest aspects of the H.Y.V.P. It can, however, be argued (at least so far as wheat is concerned) that even without extensive trials/demonstrations prior to the inception of the programme, the spread of these varieties is something phenomenal within this short interval of 2-3 seasons. Undoubtedly, the spread of the programme, in terms of area coverage has been pretty fast. But the more important aspect of the programme is the acceptance by the farmers of the recommended practices in a package. Towards achieving this end, extensive trials/demonstrations seem to be imperative both from the immediate and long range point of view. The bulk of cultivators largely get influenced from what happens in their vicinity. The more progressive and the influential among them have access to farther away places and research centres. The experience of the last season has also shown the short but substantial gains made by a few individuals at the cost of the rest.

1.16. The availability of adequate number of agricultural extension personnel is a pre-requisite for intensifying agriculture. Besides numbers, periodical training of such staff particularly in the new technology, is also essential. In order to cope up with the increasing demand arising from the introduction of the H.Y.V.P., strengthening of the Block Agricultural Extension personnel was contemplated in programme areas. It was also necessary to ensure minimum disturbance by way of transfers among such available staff in an area. Data collected on these aspects in the sample blocks are presented in Appendix Tables 1.2 to 1.4. The following are some of the highlights of this analysis.

(a) In the 15 sample blocks, the number of agricultural extension officers rose from 32 in the year prior to the introduction of the H.V.P. to 38 during the current season. During last year's Rabi this was still higher at 41.

(b) The number of V.L.Ws. in these blocks rose from 146 to 172 whereas in the category of 'other Agricultural staff' (Mistries, fieldmen, etc.) the increase was marginal over the same period.

(c) In all these three categories, the number of transfers declined (substantially among the AEOs.) over this period, indicative of concerted action at higher levels to keep the same field staff intact.

(d) The number of training camps held for the benefit of both officials as well as farmers declined by about 30 per cent during this Rabi season. The number of officials and cultivators trained during this Rabi season also declined by 16.6 and 35.4 per cent respectively for these two categories. The rate at which the programme is spreading does not warrant any slackening of efforts on an important aspect such as this. On the contrary, the tempo is expected to increase substantially.

(e) It was gratifying that all the sample villages (other than V.L.W. headquarter Villages) and 93.3 per cent of the sample villages were visited by the V.L.W. and the A.E.O. respectively during the Rabi season of 1966-67. Even the B.D.O. and the Cooperative Extension Officer had visited a large proportion of these villages during this period.

(f) On an average, the V.L.W. was reported to have visited the sample villages 22 times. The A.E.O. had visited on an average 3.4 times. Since it was not possible to ascertain the duration and the nature of work done during each visit, the number of visits alone do not go very far to indicate the impact. Even so, this gives some idea of the intensity of the extension effort.

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CHAPTER II

SPREAD OF THE WHEAT VARIETIES AND SUPPLIES OF INPUTS

2.1. Some of the favourable technical aspects for the cultivation of the new varieties of wheat seem to have induced a considerable section of the cultivators specially in Punjab, Haryana and U.P. to adopt the same. The progressive outlook and the hard-working nature of the Punjab farmers have accelerated the expansion of the programme within a short period. Equally important was the organisational and promotional efforts made by the administrative and extension functionaries at different levels. While commenting on the administrative and organisational matters, we had stated in our kharif report that even though detailed instructions and guide-lines had been prepared for the benefit of lower level functionaries, in actual practice these were not fully adhered to. But in respect of the wheat programme our field experience of this season has been quite encouraging whether it is coordination or organising timely and adequate supplies or proper choice of areas. The administration, specially at the district and block levels, had been fully geared to meet the mounting demands of the programme. Barring a few exceptional cases of lack of coordination and untimely supplies of inputs, the programme was reported to have received adequate administrative and extension support.

2.2. There was, however, one special problem noticed in many of these areas in regard to fixation of targets for the districts and in turn splitting them blockwise and villagewise. The targets initially fixed for most of our selected districts underwent an upward revision as the season progressed. The district and block authorities were not consulted while fixing these targets. The contention of the district and block authorities was, that the same irrigated area had been counted for more than one source and thus inflated figures had been used for fixing the crop targets this season. On these grounds the functionaries administering the programme at the district and block levels felt that the targets were fixed unrealistically. In the observed areas of U.P., the Block authorities were required to prepare a simple farm plan (input card) for each participating cultivator. This was to be consolidated for the village and block and was to be the basis for fixing the targets. According to field reports such farm plans were prepared and consolidated but these were not considered while fixing the targets at higher levels. But the efforts of this much of local planning did not go waste as the higher targets sent down from above only meant preparation of additional farm plans in the relevant villages.

2.3. The above narrated official exercise did mean more work particularly on paper. But it is the farmer, the progressive as well as the average one, who relieved the official machinery of their headache and worry of achieving the targets from above. The data we obtained for the selected States and blocks proved beyond doubt that even the over-ambitious targets had been overfulfilled. The data presented in the Tables No. 2.1, 2.3 and 2.4 speak for themselves. Two factors were mainly responsible for this grand achievement. Firstly, the farmer had been fully convinced of the benefits of these varieties. In fact, our field reports showed that they were almost running after the new varieties of seeds and other inputs even to far off places. Secondly, the extent of seed available with the farmer (out of the produce of 1966-67 Rabi) relieved the official machinery from this crucial burden. In certain blocks, the quantities of seeds supplied by the departmental and institutional agencies constituted only a small fraction of the total seed used in the area. But for this natural spread, the official machinery would have floundered under the heavy demand of seed alone.

Arrangements for inputs of supplies :

2.4. In our kharif study reports, the organisational aspects in regard to supplies of the crucial inputs such as seeds, fertilisers, pesticides and credit have been dealt with at great length. By and large, the pattern of organisation for effecting such supplies to programme areas was the same even during the Rabi season. For instance, the proceedure laid down and actually followed for multiplication, procurement and distribution of improved seeds for wheat crop, was almost the same as for paddy crop. The arrangement contemplated for credit disbursement to participant cultivators also was the same. Thus our main observations of the kharif season in regard to arrangements made for the supply of inputs to cultivators hold good for this season also.

2.5. In this section the details of input supplies regarding seeds and credit in the selected blocks, villages and the respondent cultivators are analysed. In regard to supplies of fertilisers and pesticides we were not able to get comparative data for this as well as the last rabi season separately for H.V.P. and non-H.V.P. areas, at the State, Block and village levels. In many of our selected areas the officials responsible for the distribution of these materials have not maintained the seasonwise as well as the cropwise distinctions and hence even the limited data that was obtained from some centres did not facilitate useful comparison. However, the analysis regarding the extent of adoption of recommended practices by participants in the next two chapters, in a way, brings out the position of use of fertilisers and pesticides.

Improved Seed :

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2.6. Before the data on the supplies of seeds, its adequacy, timeliness, etc., are discussed, it would be useful to reiterate certain important aspects of seed multiplication and distribution system.

(a) The first phase of multiplication of seeds in regard to wheat was the State seed farms. From the field reports it was observed that in most of our selected areas such farms were in operation.

(b) The seeds so multiplied in the farms were given to registered growers/progressive cultivators for further multiplication and it was observed that in most areas the system of registered growers was prevalent. But the seeds produced by such growers were not procured fully as in Rohtak district of Haryana, but the registered growers sold the seeds to individual cultivators.

(c) The rabi season of 1967-68 witnessed probably one of the most extraordinary features, so far as the demand for the latest varieties from the cultivators is concerned. The prices at which these are reported to have been sold were fantastic and probably will go down as a significant event in the history of agriculture for these relevant States. The following extracts from our field reports bear ample testimony for this feature:

> "Because of the successful results of H.Y.V. seeds, the cultivators had been very anxious to grow these varieties on their fields. Hence they made all out efforts to get not only Lerma Rojo or Sonora-64 but also S-227, S-308 and such other varieties which are high yielding and not even released for general adoption. The private traders and a few progressive cultivators who had stocks of scarce seeds like S-227 and S-308 exploited the situation and sold the seeds at unimaginably high rates." (Field report from Saharanpur).

> "It was observed during the visit to the selected villages that some cultivators in their zeal for growing the latest dwarf varieties of wheat had obtained S-227 and S-308 seeds from outside at very high rates, but they were duped and the seeds supplied were not pure. People have been running after the 'triple dwarf' variety which is considered to be very high yielding and under that name a few had purchased also, but later on it was publicised by the Information Officer of the Punjab Agricultural University that no such variety had so far been released and no cultivator should purchase it with that name." (Field report from Ludhiana).

(d) Lastly, it may be noted that the seed distribution data we obtained from the official agencies give only a fraction of total supplies received by cultivators. But for the abundance of local supplies of the last season, it would not have been possible to meet the tremendous demand that arose for these varieties mainly due to the good record of yields in the previous season.

2.7. The sources of supply and adequacy of distribution points in programme areas contribute in a good measure to the success of the programme. In the selected blocks the number of distribution points for fertilisers, pesticides and equipment registered an increase during the rabi season of 1967-68 compared to the previous rabi. But in regard to the supply points for seeds, there was a decline during this season mainly because of the shrinkage in cooperative depots from 30 to 6 in Haryana and from 61 to 58 in U.P. Otherwise the number of supply points increased both under cooperatives and the agricultural departments for other inputs. Another noteworthy feature was that the V.L.W. was an important source of supply for seeds, pesticides and equipment. For Statewise details on this aspect, Appendix Table No. 2.5 may be referred.

2.8. The decline in the number of supply points for seeds in Haryana requires an explanation. With the advent of H.Y.V.P., the responsibility for the seed supplies was transferred to the Cooperative Department from the Agriculture Deptt. This was done on an experimental basis. But this was reported to have failed and again this function was retransferred to the Agriculture Department. The decline in the number of cooperative seed stores is probably due to this factor.

2.9. In the selected blocks about 94% of the total quantity of seed obtained, both locally and from outside, had been distributed during the rabi season of 1966-67. As against this, only 90% of such quantities had been distributed in the current rabi season. This was mainly due to the poor response to the programme in Maharashtra. (Only 8% and 24% of the stocks obtained respectively during these two seasons were distributed). In two selected blocks of Punjab also, the proportionate quantity distributed declined compared to the last rabi season. This was mainly due to the quick switch-over by the cultivators to the latest varieties and the stocks of the first two Mexican varieties (Lerma Rojo and Sonora-64) remaining undisturbed. However, during the rabi seasons of last and this year, the seed supplies were reported to be generally adequate and timely in all our sample blocks. The Appendix Table No. 2.6 may be seen for further details in this regard.

2.10. Thirty-nine out of the 45 sample villages reported on the extent of seed supplies according to different sources. Data of a similar nature were also collected for sample respondents. These are presented in Appendix Tables Nos. 2.7 and 2.8. The following are the main features of this analysis :

(a) Nearly half of the total quantity of seed supply in the sample villages was accounted by the Block/Departmental agency. But only a little over a quarter of the cases of seed supplies to participants was accounted by this agency.

(b) Both for the sample villages and the sample respondents local supplies of seeds was a prominent feature during this season. More than three-fifths of the cases of seed supplies to participants were accounted by 'other cultivators'.

(c) For these villages as well as respondents, the supplies effected by institutional agencies constituted less than 1/10th of the total quantity distributed/cases of supplies.

(d) A large proportion of the cases of seed purchased by the participants were on cash/credit basis. However, about a fourth of the cases reported exchange of seeds.

(e) Supplies were reported to be timely irrespective of the source. In 96.18% of the cases, seeds supplied by departmental agencies were 'treated seed'. But this was less than half in the cases of seeds purchased through 'other cultivators'. The last mentioned point needs to be specially noted as large scale 'natural spread' as in this rabi season entails an element of risk because of the use of untreated seeds. Therefore, it is necessary to stress that proper facilities should be provided for processing the seeds even for such supplies made by cultivators on a mutual basis, at local levels.

Registered Seed Growers

2.11. The role of registered seed growers/progressive cultivators in the context of multiplication of seed and its natural spread cannot be over-emphasised. As in the kharif study, one registered grower per each selected village was contacted for collecting relevant information. There were no registered growers in the sample villages of the selected blocks of Punjab and Maharashtra while in the remaining selected blocks 21 registered growers, in all, were selected. All these selected growers had an operational holding of 5.00 acres and above including 17 of them having 20.00 acres or more. There were no formal contracts entered with the growers in Bihar and U.P. In Rajasthan, the agreements entered into specified the conditions regarding the supply of seed by the department for multiplication and the sale of the produce, in turn, to the department. In Haryana, in addition, the obligation for the growers to observe all the recommended practices was also incorporated in the contract.

2.12. The selected growers were observed to have sown the area to the extent agreed upon and the department was the main source of supply of seed except in Haryana where the N.S.C. also supplied seed for about a tenth of the requirements. About a fifth of the produced seed was procured by the department and about the same quantity was locally sold/exchanged by the growers. Only 12 selected growers reported availing any facilities offered including supply of seed. Supply of chemical fertilisers and technical guidance were reported by 8 growers and another 3 growers reported availing credit facilities. One grower each reported obtaining plant protection material on subsidy and free spraying/dusting of the fields. The supervision and guidance provided by the extension staff to ensure purity of seed was reported to be quite satisfactory in all the selected areas. A significant proportion of the selected participants also adhered to the recommended measures in threshing and storing the produce. 18 out of 21 respondents reported satisfaction with the produce and because of good demand for some of these varieties, the seed production proved generally quite remunerative.

Credit supply :

2.13. Timely and adequate supply of credit to participant cultivators promotes the application of recommended levels of inputs to H.V. crops, the cost of cultivation of which is very much higher than the other crops. The analysis regarding the cultivation expenses in a later chapter of this report will bear ample testimony to this feature. In this section the extent of credit facilities provided for this as well as the normal programmes at the block, village and respondent levels are discussed. The policy regarding the credit supply, viz. liberalisation, modification of procedures, enhancement of credit limits etc. were more or less the same as in the kharif season.

2.14. In our kharif report it had been mentioned that a considerable part of the amount earmarked for H.Y.V.P. could not be utilised because of a number of problems such as delayed sanctions, defaulters among institutions and individuals. In regard to the rabi wheat these general problems were prevalent to some extent in certain areas but the extent of disbursement of cooperative credit witnessed significant improvement during the current rabi compared to the previous rabi season. In the selected blocks while only 40% of the allotted amount was disbursed by cooperatives during rabi 1966-67, in this season the entire allotment had been disbursed. Nearly all the amounts earmarked under the departmental credit had also been disbursed during both these seasons. The disbursement of credit for non-H.V. crops was observed to be satisfactory in both these seasons in the selected areas. There was an eight-fold increase in the number of beneficiaries receiving cooperative credit between these two seasons. Further details, Statewise, may be seen in Appendix Table No. 2.9.

2.15. In the sample villages the extent of credit made available (irrespective of H.V.P. or non-H.V.P.) did not show any appreciable improvement over the last three rabi seasons. On the contrary, there was a marginal decline from Rs. 11.32 lakhs in 1965-66 to Rs. 11.19 lakhs in 1967-68 mainly due to a fall in the extent of cooperative credit made available.

The departmental credit registered a substantial increase from Rs. 4.1 lakhs in 1965-66 to Rs. 6.6 lakhs during the current rabi season in these sample villages. A similar trend was noticed in the average amount disbursed per beneficiary under the cooperative and departmental sources. No credit was disbursed in the sample villages of Rajasthan as the defaulting cooperatives could not procure any funds from the Central Bank. Appendix Table No. 2.10 may be seen for more details in this regard.

2.16. The extent of membership of cultivators in cooperatives is one of the indicators of the popularity of such institutions. At the time of household listing in the sample villages information was collected regarding their membership for these institutions. This information was, however, relevant for those growing wheat crop in the current season. An analysis of this data according to size group of operational holdings may be seen in Appendix Table No. 2.11. More than 70% of the participant cultivators were members of cooperatives in these villages, whereas only 35% of non-participants reported such membership. There were no marked variations in the proportion of cooperative membership as between different size groups of holdings. However, among the larger cultivators the number of members in cooperatives was relatively less both among participants and non-participants possibly, due to their better economic condition.

2.17. Among the selected participants in the study, about two-thirds reported membership in cooperatives. In Bihar and Rajasthan, the proportion of membership among selected participants was less than a quarter. About two-thirds of participants were served by cooperatives within the village and another one-fifth of them were served by cooperatives situated beyond five miles from their village. The following summary statement gives further details Statewise :—

II.1. *Percentage distribution of selected participants according to membership in Cooperatives*

State	P.C. reporting membership in Cooperatives	P.C. distribution according to distance of cooperatives		
		Within the village	Within 5 miles	5 miles or more
Bihar	21·88	100·00	—	—
Haryana	46·03	93·10	—	6·90
Punjab	80·17	100·00	—	—
Rajasthan	23·68	100·00	—	—
U.P.	75·00	35·42	26·39	38·19
All States	63·95	66·31	13·48	20·21

2.18. From the respondent participants data were collected regarding the extent of their borrowings (cash and kind) from various sources for cultivation of H.Y. varieties/other crops both for the current season as well as last rabi. These are presented in the Appendix Table No. 2.12. The number of H.V. growers borrowing from various agencies increased 5 times during this season over that of 1966-67 Rabi (from 27 to 136). The amounts borrowed during this season increased by about 9 times over last year's rabi (from Rs. 3696/- to Rs. 31,623/-). The number of borrowers for 'other crops' declined by about 50% during this season and the amounts borrowed for such crops also showed a steep decline (from Rs. 38,165/- to Rs. 10,344/-). This trend confirms our earlier observation that the spread of the H.Y. wheat varieties has been quite fast even within the short period.

2.19. The participants borrowed from different sources viz. Block, department, cooperative, and others. The extent of credit given for H.Y.V.P. during last year's rabi was more or less equally shared among all these four agencies. But during this rabi season more than half of the credit was made available by the cooperatives and to larger proportions of participants. Next important source was the block agency lending about a quarter of the total credit disbursed for H.Y.V.P. in this season. It is significant to note that none of the sample participants had borrowed from 'other miscellaneous' sources during this season. This in a way brings out the impact of the special measures taken by the Government and the institutions to cater to the full credit needs of this programme.

2.20. For the cultivation of these varieties application of inputs is recommended at a much higher level than other varieties. To ensure such adoption, loans are required to be given both in kind and cash. The extent of borrowings by respondents in kind as well as in cash was ascertained. During rabi of last year about 71.8% of the total credit disbursed for H.Y.V.P. was in kind. This proportion increased to 91.4% during this season. Agency-wise, both the block and departmental loans were given only in kind over these two seasons, whereas the proportion of kind loans issued by cooperatives increased to 85.2% during rabi 1967 from a mere 28.8% during the last year's rabi. Although it is necessary to issue a certain proportion of the loan in the form of fertilisers, seeds, pesticides, etc., it may not be prudent to load the cultivator with the bulk of the loan in kind, firstly, because of the heavy cash expenses he has to incur on labour charges and secondly, because of the likely diversion of the excess quantities issued, to other crops. To safeguard against such contingencies it is considered that a built-in kind component ranging from 50 to 60% should be deemed sufficient. For details regarding variations etc., between the different States, Appendix Table No. 2.12 may be seen.

CHAPTER III

THE PARTICIPANTS AND THE EXTENT OF ADOPTION

3.1. This chapter deals with the analysis relating to the extent of adoption of H.Y. wheat varieties by the farmers in terms of coverage, etc. and the extent to which the various recommended practices were adhered to in the cultivation of these varieties. The detailed technical recommendations referred are as per the standard technical literature issued by the departments at the Centre and in the States. The orientation in this analysis is to highlight the overall trends noticed in the levels of adoption against such recommendations. For details Statewise, Appendix Tables are to be referred.

(A) *The Participants and area coverage* :

3.2. More than two-fifths of the cultivators growing wheat crop during the current Rabi adopted the high yielding varieties in the sample villages. Punjab was leading with 80 per cent of the cultivators adopting, followed by Bihar (59 per cent), U.P. (42 per cent), Rajasthan (31 per cent) and lastly Haryana (16 per cent). The extent of adoption was generally encouraging among all the classes of cultivators and was about a third among the smaller cultivators and about two-fifths among the bigger and medium cultivators. Among the selected participants the smaller and bigger cultivators constituted about a fifth and fourth of the total, respectively, while the remaining belonged to medium category of cultivators with operational holding of 5 to 20 acres.

3.3. The V.L.W. was reported to be the main agency approaching the cultivators for adoption, accounting for more than half of selected participants. The next in importance was cultivators including progressive farmers, who induced about a quarter of the participants to take up these varieties. While the role of the V.L.W. was prominent in Bihar, U.P. and Rajasthan, the role of progressive cultivators was significant in Punjab and Haryana. The efforts of the other functionaries were somewhat limited in this regard. About 9 per cent of the participants adopted the H.Y. varieties on their own without anybody approaching them; but many of them reported knowledge from printed literature or radio and other general media of communications. Only about 5 per cent of the participants were influenced by trials/demonstrations.

3.4. The demonstration programme appeared to have started when the programme was already under implementation. Of the cases witnessing the trials/demonstrations reported by the selected participants, about 94 per cent were held during the Rabi—1967 or the current Rabi. But one notable feature was that about two-thirds of such demonstrations were conducted in the fields of the cultivators only. In the relevant States (except Rajasthan) a third to about two-thirds of the selected participants reported seeing demonstrations. But of those seeing demonstrations, the proportion adopting was much higher in Punjab and Haryana than in Bihar and U.P.

3.5. The high yielding wheat varieties were adopted by as many as 62.2 per cent of the selected participants during the current season only for the first time. Another 36.4 per cent of them initially adopted these varieties during the last Rabi. Only 1.4 per cent of the participants reported cultivation of the varieties earlier to the Rabi season of 1966-67. In Punjab, Haryana and U.P. relatively the adoption was larger during the current season while in Bihar and Rajasthan the proportion adopting earlier was more. But the cases of earlier adoption were generally observed to be among the bigger cultivators, who thus gave a lead to others in the new technology.

3.6. Regarding the increase in the coverage of area under H.Y. varieties for the participant cultivators, the area was observed to have increased from a mere 11.7 acres in 1965-66 or earlier to 296.8 acres during the last Rabi and to 1421.1 acres during the current Rabi. This increased coverage was, however, mainly due to the larger number of selected participants adopting these varieties in the later seasons. But, even otherwise, the coverage under high yielding varieties increased by 262 per cent for the earlier adopters and by 131 per cent for the adopters of last Rabi during the current season. The average area per participant under the high yielding varieties during the current season worked out to 3.07 acres. This area increased with the increased operational holding of the participants, ranging from 0.46 acres for the smaller cultivators with less than 2.5 acres operational holding to 10.69 acres for participants having operational holding of 50 acres or more. It is worthnothing in this context that the proportion of cropped area covered under H.Y. varieties was almost of the same order in the case of all size-group of participants. State-wise, the average area under H.Y. varieties per participant was the highest in Punjab (5.05 acres), followed by Rajasthan (4.31 acres), Haryana, (4.21 acres), U.P. (1.70 acres) and Bihar (0.75 acres).

(B) *Adoption of recommended practices* :

3.7. The newly introduced wheat varieties (both Mexican and indigenous), according to agricultural scientists, are capable of giving substantially higher yields at high doses of fertiliser application. Thus, their cultivation implies conscious adoption of recommended practices to achieve the best results. Detailed recommendations for this purpose are formulated right from the preparatory stage upto harvesting and threshing. In this section, data collected from the sample participants regarding their adoption of recommended practices, etc. are analysed. The main objective of this analysis is to bring out the extent of adoption of these practices so that the problems etc., faced by cultivators could be identified. But it is for the policy makers, the administrators and the extension workers to examine these and remove the deficiencies. At each stage of crop growth or agricultural operation, the broad recommendations are detailed against which the extent of adoption has been examined. The Appendix Tables contain Statewise details on these aspects.

Preparatory Stage :

3.8. Deep ploughing after the harvest of the preceding crop to be followed upto 5 ploughings with desi plough is recommended to obtain a fine tilth for good germination. To prevent attack of white ants, etc., basal application of pesticides is also indicated. The selected participants had sown high yielding wheat varieties in 1084 plots, in all, during the current Rabi season. In 6.8 per cent of these plots, tractor ploughing was undertaken while 37.5 per cent of the plots reported ploughing with iron ploughs and the remaining with desi ploughs. In regard to tractor ploughing the number of ploughings is not quite relevant, while 4 to 6 ploughings with iron plough can be considered sufficient. More than 6 ploughings with desi ploughs may become necessary. Thus, the proportion of plots receiving adequate number of ploughings as per these standards worked out to about 62 per cent. But only about a quarter of the plots had been ploughed to more than 6″ depth while another 72 per cent had been ploughed to 4″ to 6″ depth. On the whole, the performance regarding preparatory ploughing appeared to be quite encouraging.

3.9. Tractor ploughing was mainly limited to bigger cultivators, particularly in Haryana and Punjab and to a small extent in Rajasthan and U.P. The use of iron plough was also proportionately more in Punjab followed by Rajasthan, U.P. and to a small extent in Haryana mainly by the bigger and medium cultivators. No cases of tractor ploughing or use of iron plough were reported from the selected participants of Bihar. The proportion of plots having adequate number of ploughings worked out more than half and upto three-fourths in all the States except Bihar where this proportion was slightly more than a tenth only. However, there was not much variation in this proportion covered among the bigger, medium and smaller cultivations. The smaller cultivators achieved this level by more number of ploughings with desi plough, while the medium and big cultivators achieved this by the use of iron plough and tractor. In regard to the depth of ploughing, about 42 per cent of the plots were ploughed more than 6″ deep by the selected cultivators in U.P. followed by Haryana (28 per cent) and Rajasthan (11 per cent). Basal application of pesticides was observed to be popular in Rajasthan only (about 80 per cent of plots reporting) while this was adopted to a limited extent only in U.P. and Haryana.

The application of chemical fertilisers (preparatory stage)

3.10. The application of chemical fertilisers at substantially higher doses is one of the crucial aspects in the cultivation of these new varieties. Broadly, the nitrogenous fertilisers upto 60 Kg. in terms of 'N' per acre is generally recommended except in the case of lands growing leguminous crops or left fallow during the preceding season where 10 to 15 per cent reduction is advocated. Phosphatic fertilisers upto 20 to 24 Kgs. in terms of P_2O_5 and potassic types upto 60 Kg. in terms of K_2O_5 are the other general recommendations. The application of these fertilisers is recommended as basal dressing in one dose except for nitrogenous types which are to be split for basal and top dressing. These broad recommendations imply application per acre, upto 300 Kg. of Ammonium Sulphate, 150 Kg. of Superphosphate and 100 Kg. of Muriate of Potash. These doses can be marginally modified to suit local conditions or based on data regarding actual soil tests in particular areas.

3.11. In the selected districts of Punjab and Haryana, the doses of 'N' recommended were nearer to the broad indications as above and was of the order of 250 Kg. to 300 Kg. of A.S. per acre. In Rajasthan and U.P., the dose recommended was lesser at about 200 Kg. A.S. and in the unirrigated areas of U.P. at half the above doses. In respect of phosphatic types also recommendation in U.P. was about half the general recommendation while in Punjab, Haryana and Rajasthan 125 to 150 Kg. of Super Phosphate was indicated. The recommendations regarding application of potassic types was still less in all the areas and was 45 Kg. in terms of K_2O_5 in Haryana, upto 20 Kg. in Punjab and about 10 to 15 Kg. in other States. It was also indicated that the soil deficiency in this respect was not significant in many areas and was not to be rigidly accepted.

3.12. Chemical fertilisers were reported to have been applied by about four-fifths of the participants. The adoption was less than this proportion only in Rajasthan (47 per cent)and Haryana (62 per cent). The application of all the three types viz. N,P and K in combination was reported for about a quarter of the participants only and was adopted by a relatively larger proportion of participants in the selected areas of U.P. The summary table below gives the application of chemical fertilisers Statewise and by size group of operational holding of the participants.

III. I Percentage distribution of participants applying chemical fertilisers (N. P and K types) in combination.

State/size group.	Percentage of participants applying			
	any chemical fertiliser	N+P+K	N+P only	N+K only
(1)	(2)	(3)	(4)	(5)
Bihar	93·75	—	40·63	—
Haryana	61·90	6·35	17·46	—
Punjab	91·38	12·93	39·65	—
Rajasthan	47·37	5·26	26·31	—
U.P.	80·73	46·35	16·67	2·08
All States	78·91	24·94	25·40	0·11
Size-groups :				
Less than 2·5 acres	78·05	41·46	17·07	—
2·5—5·0 acres	80·39	31·37	19·61	3·92
5·0—10·0 acres	88·12	29·70	25·74	0·99
10·0—20·0 acres	78·57	18·57	29·29	0·71
20·0—50·0 acres	69·15	18·06	26·60	—
50·0 & above	78·57	28·57	21.43	—

3.13. Regarding the extent of application of chemical fertilisers by the participant cultivators to their relevant plots, about 15 per cent of the plots were not applied with any chemical fertilisers at all at the stage of basal dressing. However, this proportion was higher in Rajasthan (36 per cent) and Haryana (31 per cent) and was to a lesser extent in the selected areas of the other three States. There was no marked change in this proportion among the smaller, medium and bigger cultivators. The application of mixture grades was reported for about 5 per cent of the plots in U.P. only while in the other States only straight fertilisers were used.

3.14. The basal dose of nitrogenous fertilisers was reported for 73.52 per cent of the plots including 22.14 per cent of them obtaining 100 Kg. or more of Ammonium Sulphate per acre. The average dose applied per acre at this stage was 73.6 Kg. of Ammonium Sulphate. Statewise, the average dose was less than the above in Bihar (46.9 Kg), Haryana (66.2 Kg.) and Rajasthan (61.4 Kg). The proportion of plots obtaining nitrogenous fertilisers was, however, higher in Bihar (97.22 per cent) and Punjab (88.92 per cent) campared to the other three States where relevant proportions were 26.66 per cent, 51.56 per cent and 73.80 per cent respectively, for Haryana, Rajasthan and U.P. There was no particular variation associated with increasing size of operational holding of the participants; on the contrary, there was some marginal decrease in the proportion of plots covered and the average dose of application.

3.15. The application of phosphatic and potassic types was to be in one dose as basal dressing while nitrogenous types could be applied in split doses. Only 53 per cent of the plots were reported to have received application of phosphatic fertilisers at an average dose of 115 Kg. of Super Phosphate per acre. 100 Kg. or more of Super phosphate per acre was reported for 28 per cent of the plots while the remaining quarter of plots had received still lower doses. State-wise, the proportion of plots applied with phosphates was the highest for U.P. (65 per cent), followed by Punjab (53 per cent), Rajasthan (40 per cent), Bihar (37 per cent) and Haryana (31 per cent). The average dose applied was also higher ranging from 116 to 140 Kg. of Phosphates in Rajasthan, U.P. and Punjab while in Bihar and Haryana the dose was less than 70 Kg. The application of phosphatic fertiliser was slightly better in the case of cultivators with larger operational holdings.

3.16. The use of potassic types was limited to about 27 per cent of the plots and the average dose applied was about 30 Kg. per acre in terms of Muriate of Potash. Statewise, the application was found to be significant in U.P. only where about 47 per cent of the plots were given potash followed by Punjab with about 16 per cent of the plots. In Haryana and Rajasthan, less than a tenth of plots received potash while in the selected areas of Bihar no such cases were reported at all. According to size of operational holding not much of variations as between different size groups of participants were observed.

Sowing operations:

3.17. The seed recommended per acre for the high yielding wheat varieties range from 30 to 50 Kg. in general. In Punjab the recommended rate was 30 to 35 Kg. and such local variations were also observed in the other selected areas. These varieties were to be sown shallow at a depth of not more than 2½ inches, as otherwise, the germination gets affected. The other important recommendation was proper spacing and about 9″ distance was to be maintained between the rows. In the sowing operations by the selected participants, the recommended range of seed rate was reported for about 71 per cent of the sowings while in the case of 26.25 per cent of them the seed rate was below the recommended rate. The remaining cases were above the recommended range. The depth of sowing was between 2 to 3 inches in the case of 94.47 per cent of the cases and in the remaining cases sowings were done at more than 3 inches of depth. The average depth of sowing was 2.4 inches and only in Bihar and Rajasthan the average was about 3″. The distance between the rows was 9″ or less in all the cases and closer spacing was observed in relatively larger proportion of cases in Rajasthan and Bihar.

3.18. There were no marked variations in the adoption of these practices according to size of operational holding of the participants. Only in regard to spacing, larger proportion of closer sowings was, to a certain extent, associated with larger operational holding of the participants. But on the whole, the adoption of recommended practices was satisfactory in all the States and among all classes of cultivators.

Plant Protection Measures :

3.19. The prophylactic measures recommended for protecting the high yielding wheat crop include seed treatment (with Agroson G.N. or Serasan), control of weeds (by spraying 2,4-D) and spraying and dusting of the standing crops (with B.H.C., D.D.T., etc.). Specific curative measures are suggested according to the occurrence of particular pests/diseases at various stages of crop growth. The supply of seed by the institutional agencies was generally pre-treated with chemicals as noted in the preceding chapter. But the seeds supplied by "other cultivators" were untreated to the extent of about 55 per cent. Even in respect of own supply of seed, only in the selected areas of U.P. the seed treatment was reported on a sifinificant scale. During the Rabi season of 1967-68, a large bulk of seed supplies were met within the locally available seed from the previous season's crop and the fact that the bulk of seeds supplied by fellow cultivators were untreated, go to show the deficiency of the arrangements for proper processing of seeds. Whatever expansion that is contemplated in the seed processing industry, should not become the exclusive monopoly of institutional supplies; individual cultivators should have access to get their seeds treated with nominal charge.

3.20. Regarding plant protection measures at the stage of standing crop, the extent of adoption was observed to be quite unsatisfactory in all the States. In Haryana and Rajasthan, the area coverage under plant protection measures in selected villages was not readily available while in Bihar such coverage was reported to be 'nil' in the selected villages. Of the remaining two States reporting such coverage, the U.P. villages were relatively better (compared to Punjab villages) with the high yielding relevant area covered by preventive and curative measures reported upto 29 per cent and 1 per cent, respectively. In Punjab, such coverage was reported to be respectively 15 per cent and half of one per cent of the area.

3.21. The adoption of these measures at the participant level also reflects the above situation. In Bihar, only one out of 32 participants reported use of chemicals in standing water as a preventive measure while in Haryana no cases of taking any preventive measures were reported. In Rajasthan only cases of poison baiting were reported by 7 out of 38 participants. Only in Punjab and U.P. a small number of cases of spraying and dusting in addition to other treatments were reported. It is significant that only 13 per cent of the participants reported attack of pests/diseases in the fields mainly in Punjab (33.62 per cent) and U.P. (7.81 per cent). Curative measures by the relevant cultivators were taken in relatively more cases in Punjab (69 per cent) compared to U.P. (27 per cent) and in both States with satisfactory results. It is quite likely that at the stage of crop growth light attack of pests/diseases might not have been observed in some of these areas. This analysis shows that the attention paid by cultivators to prophylactic recommendations was very meagre. We pointed out in our kharif report that adoption of systematic preventive measures depends upon the understanding of the cultivators regarding such measures and also means considerable expenditure for him, particularly on an individual basis. It is for this reason we suggested then that prophylactic measures should be organised on a community basis so as to make the programme effective and economical. It may also be pointed out that in an agricultural year such as the one that has gone by, it would be much more difficult to persuade the cultivators to take up preventive measures as there were no symptoms even of any large scale break out of pests/diseases for wheat crop. Even so it is not desirable to ignore this vital aspect as pests/diseases can land without much of warming and cause sufficient damage.

Irrigation and water management:

3.22. Dependable irrigation sources or assured rainfall was one of the important criteria for selection of area for propagating the high yielding wheat varieties. For adopting specific recommendations regarding water management in the cultivation of these varieties, controlled irrigation seemed to be more advantageous. Thus the participants owing their own irrigation sources were more favourably situated compared to those depending on major sources to a certain extent. Ownership of irrigation sources on individual basis was reported to a large extent in Punjab and Haryana and to a smaller extent from the selected areas of U.P. and Bihar. In all 353 irrigation sources were reported to have been owned by the selected participants. Of these, tubewells accounted for 34.3 per cent and wells 51.3 per cent. The remaining sources comprised of small tanks, spring channels etc. A good proportion of the tubewells (45.45 per cent) came into existence during the last few years only, while the other sources were mainly acquired earlier.

3.23. Regarding water management at farm level for the high yielding wheat crop, irrigation at critical stages of crop growth is said to enhance the yields substantially. 5 to 7 irrigations are recommended according to type of soils and 2 to 3 more irrigations may be given for light soils. Irrigation is, however, essential at the crown root initiation stage (between 3rd and 4th week of sowings), late tillering, flowering and dough stages of crop growth. Thus, at least 5 waterings appear to be in the absolute minimum. The plots sown with high yielding wheat varieties by the selected participants were in almost all the cases irrigated (except 8 out of 1084 plots). But the proportion of plots given 5 irrigations or more came to 35.8 per cent only and this proportion was the highest for Rajasthan (92.2 per cent) followed by Punjab (66.8 per cent) and Haryana (33.8 per cent). In U.P. and Bihar the proportion of plots having this number of irrigation were respectively 14.7 per cent and 4.2 per cent. The lesser number of irrigations reported in some of these States is possibly due to timely seasonal rains. The summary Table below gives the percentage distribution of plots (Statewise) according to number of irrigations.

III. 2 Percentage distribution of plots by number of irrigations given

State	One to two irrigations	Three irrigations	Four irrigations	Five irrigations or more	Total
(1)	(2)	(3)	(4)	(5)	(6)
Bihar	8·33	50·00	37·50	4·17	100·00
Haryana	17·00	18·24	31·08	33·78	100·00
Punjab	6·31	13·29	13·62	66·78	100·00
Rajasthan	3·12	—	4·69	92·19	100·00
U.P.	19·79	38·78	26·73	14·70	100·00
All States	13·86	27·26	23·07	35·81	100·00

3.24. Apart from the number of irrigations given, information regarding the adequacy of irrigation in general, sourcewise, was also ascertained from the participants for the high yielding wheat plots. Of the total plots, 91.2 per cent were reported to have got sufficient irrigation and this proportion was less than 90 per cent only in Rajasthan. In this State the only source of irrigation was reported to be canals and deficient water supply was reported for as many as 38.1 per cent of the plots. This situation further lends support to our earlier observation that minor irrigation sources seem to be more amenable for ensuring scientific water management. It is, however, difficult to restrict the scope of the programme only to such areas; but it should be possible to improve the water management practices through better organisation and management of the large public sources.

Inter-culture operations :

3.25. Regular inter-culture operations are necessary to eradicate the weeds as also ensure proper spacing of plants, thereby promoting better absorption of the nutrients by the plants. The specific inter-culture operations recommended for the high yielding wheat crop include hoeing to be taken up after first irrigation (about 3 weeks after sowing) with a view to remove the weeds and also provide aeration to the developing roots. A second hoeing may be taken up, if felt necessary with the second irrigation (after another than 3 or 4 weeks). At this stage top dressing with nitrogenous fertilisers is also advocated with the first irrigation and at the earing stage.

3.26. Of the total plots, hand weeding was undertaken in 52 per cent and the use of push-hoe was reported for another five per cent of the plots. Thus in all for about 57 per cent of the plots hoeing was reportedly done including about 6 per cent of them reporting hoeing for more than 2" depth. Inter-cultural operations were taken up in 86 per cent of the plots, for 51 per cent of them during the first month after sowing and for 35 per cent during the second and subsequent months. Top dressing with nitrogenous fertilisers was reported for 81 per cent of the plots and the average dose applied was 91 Kg. in terms of Ammonium Sulphate per acre. Statewise relatively larger proportion of the plots were covered for hand weeding in Punjab and Haryana while for hoeing and inter-culture operations the position was satisfactory in Rajasthan and U.P. also. In respect of all these operations, Bihar lagged behind the other States.

CHAPTER IV

CULTIVATION EXPENSES AND YIELDS

Cultivation expenses:

4.1. Information on cash expenditure incurred during the current rabi on specified items of cultivation was collected from the sample participants, separately for the high yielding wheat crop and all other crops combined. All items of expenditure incurred on the material inputs such as seed, fertilisers, pesticides etc., inclusive of hire charges paid during the season, were collected. Payments due for the season even though not actually incurred were also included. The value of own supplies of material and labour were not covered because of the problems of imputing the value. For similar reasons, depreciation and interest charges were also excluded. The main objective of collecting such data was the same as in our kharif Study (Please refer Second Report on that study).

4.2. The average cash expenditure incurred by sample participants on the inputs per acre for the high yielding wheat varieties worked out to Rs. 245, seven times such expenditure for other than the high yielding crops (Rs. 35). Of this expenditure, the major part was for chemical fertilisers (38 p.c.) and labour 32 p.c.) . The expenditure on seed was also quite high at about 12 p.c. while the expenditure on plant protection measures was quite less at 0.56 per cent. Statewise, the per acre expenditure was the highest in Rajasthan (Rs. 291) closely followed by Punjab (Rs. 265) and U.P. (Rs. 255). In Bihar and Haryana the expenditure was less than Rs. 200 per acre.

4.3. Compared to the cultivation expenses of other rabi crops, the expenditure for cultivation of the high yielding wheat varieties was the highest (11 times) in Haryana mainly due to the very low expenditure on the former rather than high expenditure on the latter. This ratio was the minimum in Rajasthan (about 5 times) where the expenditure per acre for the cultivation of both was the highest. In the remaining States, the expenditure on H.Y. cultivation was six and a half to eight times the expenditure of other rabi crops. The per acre expenditure was broadly observed to be increasing with larger operational holding of the participants for both H.Y. varieties and other crops. This increase was mainly accounted by increased labour charges and increased expenditure on chemical fertilisers per acre. The per acre expenditure for fertilsilers was the highest in Punjab (Rs. 106) and the lowest in Bihar (Rs. 58) while the expenditure on labour was the highest in Rajasthan (Rs. 158) and the lowest in Haryana (Rs. 30). The expenditure on seeds was observed to be more than Rs. 25 per acre in U.P., Punjab and Haryana while in the other two States it was less than Rs. 20. Charges on plant protection per acre were Rs. 7.6 only in Rajasthan while in the other States it was less than a rupee.

4.4. It is evident from the above analysis that the cost of cultivation of high yielding wheat varieties was substantially higher than that for the other rabi crops, even at the present level of adoption of improved practices and the inputs. Of the selected participants, more than half (about

56 p.c.) had incurred Rs. 200 or more on the cash inputs per acre. It was broadly observed that the higher costs on the inputs were associated with higher value of gross harvested produce as can be seen from the summary table below :

IV. 1 *Distribution of participants by cash inputs per acre and the value of gross harvested produce per acre for H.Y. wheat varieties.*

Cash inputs in Rs. per acre	Value of gross harvested produce in Rs. per acre						
	Rs. 300 or less	301-500	501-750	751-1000	1001-1500	1501-2000	Total
(1)	(2)	(3)	(4)	(5)	(7)	(7)	(8)
Rs. 50 or less	1	2	4	2	—	—	9
Rs. 51 to 100	3	10	7	7	8	—	35
Rs. 101 to 200	10	28	49	43	20	—	150
Rs. 201 to 300	11	14	37	40	29	1	132
Rs. 301 to 500	12	5	17	38	24	1	97
Rs. 501 and above. ..	4	—	3	7	4	—	18
All groups.	41	59	117	137	85	2	441

The yield levels :

4.5. Data regarding the actual yields after the completion of threshing operations were collected from the sample participants for the high yielding wheat varieties and local wheat varieties. The limitations of such data mentioned in our Second Report for kharif 1967 study, hold good for this study also and these may be borne in mind while going through this analysis. The average yield per acre for the total harvests numbering to 699 for the high yielding varieties of the selected participants worked out to 10.75 Quintals. Yields upto 20 quintals or more were recorded in 24 cases including 4 cases where the yield was more than 30 quintals. The highest average yield was obtained in the selected areas of Rajasthan (11.92 Q.) closely followed by Haryana (11.50 Q.) and in Bihar it was the least at 6.71 Q. But except in Bihar in all the other States cases of harvests of 20 Q. or more were noted, thus pointing to the potentiality of these varieties to reach very high yields. The average yield also recorded increases to a certain extent with increased size of operational holding of the participants.

4.6. The yield for the local improved varieties grown by the participants was also ascertained. In Bihar and Rajasthan, the selected participants growing the high yielding varieties did not cultivate any local improved varieties and hence in these two States such comparison of yields between these two types could not be attempted. In the other three States out of 371 selected participants, 272 (73 per cent) had grown local varieties also and the comparison of yield levels is limited to these cases only. The average yield per acre for the high yielding varieties was double that of the local varieties in Punjab while in Haryana and U.P., it was one and half times larger. Thus for these participants the average yield for these varieties was the highest in Punjab (12.33 Q.) and within Punjab, (in the selected areas of Ludhiana, the I.A.D.P. district, the yields were higher at 16.15 quintals. On the other hand, in Haryana and U.P. the average yields worked out to 10.35 Q. and 9.78 Q., respectively. The distribution of participants according to the average yields for high yielding and local varieties grown by them is given in the Appendix Table No. 4.3.

4.7. Regarding the yield levels of different high yielding wheat varieties, P.V.-18 and Kalyan S-227 appeared to be relatively better with an average yield of 16.43 and 14.35 quintals, respectively per acre. The performance of these two varieties was uniformly good in all the relevant States. Next of these two, Lerma Rojo recorded good yields. However, the participants in Bihar wholly adopted this variety and the generally poor yields reported in this State dragged down the average yield for this variety. The yield for K-68 was the least at 4.78 quintals and even within U.P. State where this was grown the yield rate was the lowest compared to other varieties.

4.8. There are a number of factors at different stages of crop growth which affect the ultimate yields. There may be differential incidence and impact of these adverse factors on the yields, according to the agro-climatic conditions and varietal characteristics of the strains propogated. Such impact of four important factors viz. lodging, shedding, attack of pests/diseases and delayed harvests was ascertained from the participants. The extent of estimated damage due to each of the above factors was also ascertained. In about two-fifths of the harvesting cases damage due to one or the other of the above mentioned factors was reported. The attack of pests/diseases was reported for about 19 per cent of the cases with an average loss of 8.3 per cent of the produce. Larger proportion of cases of pest attack was reported from Punjab (38 p.c.) but the average loss was less than 5 per cent of the produce of these affected cases. But in Rajasthan and U.P., the average loss was more than a tenth of the produce for about a sixth of the cases. In the other two States the pest attack was to a lesser extent. The next important factor reported was lodging for about 17 p.c. of the cases with an average loss of about a tenth of the produce. This problem was reported in all the States except in Bihar. Shedding was also reported to a significant extent from all the States while delayed harvests affecting production was limited to U.P. only.

4.9. Variety-wise, the extent of attack of pests/diseases (per cent cases reporting) was about the same for all the varieties but the extent of damage to the crop was relatively more for K-68 variety and Sonora varieties. Cases of lodging were proportionately larger in the case of P.V.-18 and Kalyan-S. 227 varieties but the extent of damage in both cases was quite insignificant compared to the loss reported for K-68 and Lerma Rojo varieties. Shedding was observed to be relatively more in the case of Sonora varieties and Kalyan S-227 but more damage to crop was reported for Lerma Rojo, Sonora and K-68 varieties. Delayed harvests damaging the yield was reported mainly for Sonora and K-68 varieties and this factor had a marked bearing on the extent of shedding also. On the whole, the poor performance of K-68 variety should be considered quite disappointing while P.V.-18 and Kalyan-S-227 have shown their good potential for high yield.

CHAPTER V

VIEWS ON THE PERFORMANCE AND EXTENT OF ACCEPTANCE OF HIGH YIELDING VARIETIES

5.1. There was considerable variation regarding the performance of the high yielding wheat varieties in the farms of the participant cultivators. For the varieties grown by the participants, their views regarding the performance (on not more than two important aspects) were ascertained. This assessment based on such views has an element of subjectivity and hence reflects only a broad trend and not an overall assessment of the varieties in question. Higher yield was the main feature reported, particularly for P.V.-18 followed by Kalyan-S-227 and Lerma Rojo varieties, while the least responsive, according to sample participants, was for K-68. The other important aspects stressed were the non-lodging and shorter duration of these varieties, in general. Poor quality of the grain, low market price and expensive cultivation were also mentioned by a few of the participants.

Problems faced :

5.2. Many problems were reported by the participants to be tackled yet to facilitate wider adoption and coverage under these varieties. The main problem reported was the inadequate and untimely input supplies and credit facilities. Relatively the fertiliser supply position was reported to be unsatisfactory by larger proportion of participants from Bihar, Punjab and U.P. while inadequate supply of high yielding seed was reported more from Punjab and Haryana. Problem of obtaining credit was expressed by sizeable proportion of participants from Bihar, Punjab and to a lesser extent from U.P. On the technical side, problems of early flowering and poor germination were also mentioned by the participants. Acute shortage of labour was reported from U.P., Punjab and Haryana. The other important problem was marketing the produce mainly in the selected areas of U.P., Bihar and Haryana.

5.3. The suggestions for improving the programme in the light of the problems mentioned above, obviously related to improvement in the supplies of inputs, credit and marketing. A third of the participants wanted the input to be supplied in time and in adequate quantities while enhanced credit and sanction of cash credit were suggested by about 15 per cent of them. Minimum price fixation for the produce was suggested from Bihar and U.P. and a small proportion of participants from Haryana and U.P. even suggested the outright purchase of produce by the State. The following abstract presents further details regarding suggestions :

V.1. *Percentage of participants by suggestions for improving the programme.*

State	P.C. of Participants suggesting						
	Timely supply of inputs	Adequate supply of inputs	Enhanced credit	Cash credit	Govt. purchase of produce	Min. price for produce	P.P. on mass scale
Bihar	6·25	3·13	6·25	—	—	25·00	—
Haryana	36·51	—	—	—	7·94	—	—
Punjab	24·14	25·00	17·24	12·93	—	—	6·90
Rajasthan	5·26	5·26	2·63	5·26	—	—	2·63
U.P.	19·27	11·98	10·42	2·08	9·37	25·00	1·56
All States	20·86	12·47	9·75	4·76	5·22	12·70	2·72

Extent of acceptance :

5.4. The better levels of performance of the high yielding wheat varieties during the current rabi as analysed earlier, can be traced to some of the factors such as (1) the suitability of the selected areas, cultivators and the seed varieties therto, (2) the extent of efficiency in regard to supplies, credit and extension services and (3) finally, the extent of guidance provided to the participants on various recommended practices and application of inputs. Apart from the adverse seasonal and physical factors such as lack of irrigation, if the initial selection of the farm itself is not appropriate, the reactions of the growers under such conditions are bound to be negative. Thus, the conviction to continue these varieties in the case of individual participants depended on the performance of these varieties in their farms during the season.

5.5. About nine-tenths of the participants desired to continue the cultivation of the high yielding varieties. This proportion was more than 95 per cent in Bihar, Haryana and Punjab and was less in U.P. (82.8 p.c.) and Rajasthan (71.1 p.c.). The main reasons given for continuing the varieties include higher yield (76. p.c.), non-lodging (20 p.c.), convenient duration for existing cropping pattern (15 p.c.) and less susceptability to pests/diseases (14 p.c.). Some of the other reasons for continuing were better grain quality, more straw yield, capability for withstanding drought conditions, etc.

5.6. Out of 441 participants only 48 (i.e. 10.88 p.c.) did not intend continuing the high yielding varieties and 33 of them were from U.P. and 11 from Rajasthan. The main reasons for discontinuing the varieties were reported to be the high cost of cultivation and lack of local demand for the produce as can be seen from the table below :

V.2. *Distribution of participants not willing to continue with high yielding varieties by reasons given*

State	No. reporting not to continue	No reporting				
		Costly inputs & labour	Lack of local demand for produce	Lack of irrigation	More susceptable to pests/diseases	Other reasons given
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Hissar	1	—	—	—	—	1
Haryana	2	—	1	—	—	1
Punjab	1	—	—	1	—	—
Rajasthan	11	1	4	—	2	10
U.P.	33	19	11	1	1	28
All States	48	20	16	2	3	40

5.7. Even with such limitations as were mentioned earlier in this analysis, it can be seen that the wheat high yielders have convinced of their potential, a large majority of the cultivators in all these relevant States. Thus a favourable climate both at the physical and psychological levels has been established, but this has to be nurtured carefully and pursued assiduously. The experience of the last rabi season has proved beyond doubt that the average farmer is as anxious as the Government or any other agency, to improve the yield of his crops and thereby his income. But the interest and enthusiasm now generated among the wheat growers can be sustained provided the tempo of the varietal and various other types of research work are substantially stepped up, besides fulfilling needs of inputs credit, etc. timely and adequately.

Non-participants, their knowledge of H.V.P., reasons for non adoption, etc.

5.8. In the 15 selected blocks of our study for wheat, we got a sample of 192 non-participants as against the anticipated number of 225 (at the rate of 5 per village) in the 45 selected villages. There were no non-adopters of these high yielding varieties in two of the selected villages of Moga-I (Punjab) and Phoolpur (U.P,) blocks and one in Ludhiana Block. Even in the other sample villages of Moga-I and Ludhiana and required sample of 5 could not be secured. This shows the rapid spread of these varieties and the consequent field coverage of acreage under the relevant crops in some of these observed areas.

5.9. The analysis of the non-participants data followed the pattern set in our earlier kharif report and covers aspects such as sources of knowledge regarding this programme, the views of non-participants about the performance of the high yielding varieties, reasons for non-adoption etc. The reactions of the non-participants to our query regarding the future adoption in the coming season together with the reasons etc. are also briefly dealt with.

5.10. At the very first stage of field work in the sample villages, listing of relevant households was done and an abstract table presented below gives the distribution of non-adopting households according to the different size-groups of operational holdings:

V.3· *Percentage proportion of non-participants to total cultivators growing the wheat crop, by size-group of cultivation holding*

State	Total No. of non-participants	Total NPs as % to total growing the crop	Percentage distribution by size-group					
			Below 2·50 acres	2·50 to 5·00 acres	5·00 to 10·00 acres	10·00 to 20·00 acres	20·00 to 50·00 acres	50·00 and onwards
1. Bihar ..	66	41·00	62·12	15·15	19·70	3·03	—	—
2. Haryana ..	668	83·92	0·60	2·99	25·00	47·46	22·75	1·20
3. Maharashtra	388	100·00	6·96	16·24	27·57	25·52	19·59	4·12
4. Punjab ..	223	19·93	3·14	8·07	46·64	35·42	6·73	—
5. Rajasthan ..	160	69·26	—	4·38	26·25	26·25	35·00	8·12
6. U.P. ..	1020	57·99	31·96	26·28	29·51	10·39	1·57	0·29
All States ..	2525	56·69	16·04	15·29	29·07	25·54	12·48	1·58

The proportion of non-participants was very high in Maharashtra, Haryana and Rajasthan whereas their proportion in Punjab was quite low. A little over 16 per cent of the non-participants had less than 2.5 acre of operational holdings; but a sizeable proportion among the big cultivators also, both in Punjab and Haryana, had not adopted these varieties during 1967-68. This analysis shows that there is considerable scope for intensifying the extension and publicity efforts as the varieties advocated seem to have caught the imagination of farmers in these States.

5.11. Even though these cultivators had not adopted the high yielding varieties now recommended, a large majority of these (90 per cent) had knowledge of these varieties. The sources through which such knowledge was acquired by them are presented in Appendix Table No. 5.5.

(i) As in the case of our kharif study, radio, printed literature and newspapers were an effective medium of communication. About three-fifths of the non-participants reported these as their source of knowledge.

(ii) The Block Extension agency had also played an important role and more than one-fourth of the non-participants reported this source. Progressive cultivators had conveyed this knowledge for about 12 per cent only.

(iii) The cooperative institutions did not contribute much in this regard.

(iv) The programme of trials and demonstrations was found to be one of the weakest sources even during this rabi season and very few non-participants had observed such trials and demonstrations.

(v) The fact that only about 10 per cent among the selected respondents did not have any knowledge of H.V.P. is not so very discouraging as the bulk of these belong to the observed areas in Maharashtra where these varieties are not said to be quite suitable for cultivation.

5.12. The views of the non-participants about the performance of the high yielding varieties were also ascertained. The distribution of non-participants by their views may be seen in Appendix Table No. 5.6. About three-fourths of the respondents acknowledged the higher yield potential of these varieties *vis-a-vis* local varieties. However, about three-fifths of these non-participants considered the new varieties as coarse, poor in taste/cooking quality. The new varieties were only moderately susceptible to pests and diseases and also were of short duration according to a considerable proportion of these non-participants. In regard to a few other aspects like germination, lodging and shedding, a fairly good proportion considered these varieties fairing better than the local varieties.

5.13. Inspite of such detailed knowledge about these varieties, the non-participants had not adopted these and the reasons for these were ascertained from them. Appendix Table No. 5.7 may be referred for a detailed analysis of reasons, Statewise. For about a quarter of the non-participants, the problem was the high cost of cultivation including cost of additional labour. About 30 per cent of the non-participants did not take up these varieties because of inadequate irrigation sources. Besides these, non-availability of seed in time, preference for desi varieties, lower prices and fear of loss of fodder were the reasons for smaller proportion of these for not adopting these varieties.

5.14. Regarding future adoption it was quite encouraging to note that about three-fifths of these non-participants of this season were willing to adopt these varieties during the next Rabi season. The remaining reported more or less the same reasons such as high cost, lack of irrigation, low price, etc. for not taking up even during the next season. The extent of the problem particularly irrigation varied from State to State. In Maharashtra 10 out of 15 non-participants were willing to take up these varieties during next saeson.

5.15. The above analysis of the non-participants data has thrown up certain problems in regard to the cultivation of some of these high yielding varieties. The problems such as high cost of cultivation and the lack of irrigation are known on the basis of the experience over the last few seasons. Such problems may also act as disincentive for some time and for certain sections of the cultivators. But looking at the spread of these varieties as evidenced by the experience of the participants, it is to be reasonably expected that the new technology will gain further strength over time. But all the same the problems of a basic nature such as lack of irrigation, high cost of cultivation and other problems of the technical nature like the improvements in breeding work to improve the quality of the grain etc. cannot be ignored from the long range point of view.

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PART II—*Paddy and Jowar*

CHAPTER VI

AREA COVERAGE, SUPPLY OF INPUTS AND CREDIT

Introductory

6.1. In many of the selected blocks the coverage of area under the high yielding varieties programme for the relevant crops in Rabi was quite negligible or nil mainly due to the dry seasonal spell. Thus the study for bajra and maize had to be given up while for jowar, only four selected blocks (three in Maharashtra and one in Mysore) were retained for the conduct of the study. For paddy also, due to the rotation system under major irrigation sources and other seasonal factors, the study could be conducted in 10 out of the originally selected 22 blocks. The list of blocks where the study was conducted is given in the Appendix—X.

6.2. The planning procedures and arrangement for supplies discussed in detail in the kharif, 1967 report remained more or less unchanged in the selected areas and the rabi programme was implemented on the same pattern. The Table below gives the area coverage under H.Y.V.P. in the selected blocks and villages for Rabi, 1967-68 and 1966-67 :

Table VI-I. Particulars of Area coverage under H.Y.V.P.

Crop	State	Selected Blocks				Selected villages	
		P.C. of targetted area achieved during		P.C. of area under H.Y. varieties to total relavant crop area		P.C of area under H.Y. varieties to total relavant crop area in	
		Last Rabi	Current Rabi	Last Rabi	Current Rabi	Last Rabi	Current Rabi
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Paddy	A.P.	74·42	35·21	6·32	3·20	14·86	18·08
	Kerala	30·03	1·09	4·65	0·72	3·81	0·87
	Madras	188·00	110·44	7·58	N.A.	1·56	30·17
	Mysore	94·84	128·12	25·60	58·34	28·41	25·67
	Orissa	187·30	87·83	46·89	33·23	23·21	40·40
	West Bengal	N.A.	72·00	N.A.	100·00	50·00	65·83
	All States	74·55	36·37	5·28	11·71	8·99	15·65
Jowar	Maharashtra	7·37	12·25	0·12	N.A.	0·33	N.A.
	Mysore	13·33	142·00	0·55	N.A.	1·57	4·04
	All States	9·36	22·33	0·35	N.A.	0·76	4·04

From the above Table it can be observed that the proportion of relevant paddy area under the high yielding varieties in the selected villages nearly doubled compared to last rabi and was more than five times for jowar. But the percentage of achievements with reference to the targets for the current season were relatively poorer for paddy compared to last rabi, possibly due to very high target fixed for this season.

Supply of inputs and credit

6.3. The seed supplies were reported to be more timely during this season in the selected villages and the main source of paddy seed was 'cultivators' indicative of greater natural spread. The institutional agencies were wholly responsible for the distribution of hybrid jowar seed. As in the earlier kharif, the institutional supplies were mainly on cash basis and a larger proportion of such seed supplied was treated compared to supplies from 'cultivators'. (Appendix Tables 6.1 and 6.2). The supply position regarding chemical fertilisers continued to be easy during the season in the selected villages. The relative supply position of various types of chemical fertilisers during the current and last rabi season in the selected villages is given below :—

Table VI-2. Supply of chemical fertilisers in selected villages

Types of chemical fertilisers	Percent increase in quantities supplied during current rabi over last rabi		Percent of the total quantity allocated for H.V.P. during			
			Last Rabi		Current Rabi	
	Paddy	Jowar	Paddy	Jowar	Paddy	Jowar
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Nitrogenous types ..	41·1	133·8	29·3	39·7	14·6	72·0
Phosphatic types ..	49·9	916·4	49·2	27·8	40·6	58·6
Potassic types ..	33·3	243·5	48·4	92·2	30·9	59·6
Grades	177·2	61·1	53·2	Nil	42·1	70·1

6.4. The policy regarding the liberalisation of cooperative and other loan schemes remained unchanged during this season also. Departmental loans were reported in the selected villages of Madras only and to a smaller extent in West Bengal. Otherwise the only agency providing loans was the cooperative. At the village level the break up of loans for H.Y.V.P. separately was not available. But the total loans provided registered a marginal increase both in terms of number of beneficiaries and the quantum of loan assistance in the case of selected villages for paddy during the current season compared to last rabi. For the selected villages for jowar there was, however, a decline both in the number of beneficiaries and the extent of loans as can be seen from the Table below :

Table VI-3. Particulars of credit extended by department and cooperative in selected villages

Crop	State	1966-67 Rabi		1967-68 Rabi	
		No. of beneficiaries	Average loan Amt. in Rs.	No. of beneficiaries	Average loan Amt. in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
Paddy	A.P.	424	539	451	652
	Kerala	366	431	364	433
	Madras	N.A.	N.A.	Nil	Nil
	Orissa	56	363	N.A.	N.A.
	West Bengal	37	181	40	274
	All States	930	454	968	520
Jowar	Maharashtra	702	2551	207	2353
	Mysore	87	1139	198	1340
	All States	789	2396	405	1885

6.5. Among the selected participants, however, the programme of credit extension appeared to have been availed of by small numbers. Out of 236 selected participants for paddy, only 16 obtained loans from the co-operative agency for growing the high yielding crop. 15 of them belonged to Orissa and the other one to A.P. In addition, 23 participants obtained loans for raising other than high yielding crop. The average amount of loan obtained per participant for H.V. crops was about Rs. 505 compared to about Rs. 800 for raising other crops. In regard to hybrid jowar about a fifth of the participants obtained cooperative loans for raising hybrid crop at an average of Rs. 1,036 per participant. The average amount of loan received for other than hybrid crop came to more than Rs. 3,500. This may be mainly due to limited areas under the hybrid crops compared to areas under other crops (Appendix Table 6.3).

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CHAPTER VII

THE PARTICIPANTS AND THE ADOPTION OF PRACTICES FOR PADDY AND JOWAR

7.1. The rabi study was continued in the same selected areas where the kharif study was earlier conducted but with a fresh sample of participants among the relevant cultivators. This chapter analyses the extent of adoption of the high yielding varieties and the related improved practices etc. on the same lines as in our earlier reports on the kharif and rabi (wheat) studies. However, the discussion of the various aspects is largely confined to drawing useful comparisons on the performance of these varieties with the kharif season of 1967. Detailed quantitative data are presented as usual in the Appendix Tables of this report.

7.2. *The Participants* : The extent of adoption of the high yielding paddy varieties among the relevant cultivators was of the same order (about a fifth) as in the Kharif season. The pattern of adoption among the cultivators of different size groups of operational holding was more or less the same as between these two seasons. However among the relevant States, the extent of adoption was much higher in the rabi season compared to kharif in A.P., Mysore, Orissa and West Bengal, whereas in Madras it was much smaller. In Kerala there was only a marginal increase in the proportion participating. It is interesting to note that about two-thirds of the selected participants adopted these varieties for the first time during the rabi seasons—49.6 per cent during the current rabi and 16.9 per cent during the last rabi (1966-67). Larger proportion of the participants reporting first adoption during kharif seasons was reported in the selected areas of Mysore, Kerala and Madras. The average area covered under the high yielding paddy varieties per participant worked out to 2.30 acres compared to slightly less than an acre in the last rabi. The proportion of the relevant crop area under the varieties was also more than double from last rabi.

7.3. In regard to hybrid jowar, the proportion reporting adoption was much higher in Mysore (35.2 p.c.) than in Maharashtra (9.8 p.c.). Compared to the kharif season this proportion increased eight fold in Mysore in the rabi, while in Maharashtra this was reduced to less than half. However, among the participants of this rabi, first adoption during the rabi season was reported in about four-fifths of the cases in Mysore and in all the cases in Maharashtra. The average area under the hybrid crop was slightly more than one acre per participant and the proportion of area covered under the varieties was about a sixth of the relevant crop area. Compared to last rabi, the average area as well as the proportionate crop area covered under the hybrid varieties had increased many fold (Appendix Tables 7.1 to 7.3).

7.4. The V.L.W. was the main agency responsible for extending adoption to a larger proportion of participants both for high yielding paddy varieties and for hybrid jowar as in the kharif season. The proportion of participants reporting seeing trials/demonstrations was low during this season also and was about 30 p.c. for high yielding paddy varieties. For hybrid jowar none of the participants reported seeing trials/demonstrations in

Maharashtra while in Mysore about half the participants had seen such demonstrations. Thus no appreciable improvement was observed regarding the demonstration programme in many of the selected areas during the season (Appendix Tables 7.4 and 7.5).

Adoption of recommended practices

7.5. Application of different quantities of modern inputs and other improved practices are recommended for adoption at different stages of cultivation. Data collected from the sample participants regarding the extent of such adoption of the various practices against the recommendations are analysed in this section. The broad recommendations at various stages of cultivation are the same as in kharif season for these crops. To avoid repetition of these detailed particulars, the discussion is confined here to highlight the distinct features of this season.

7.6. *Preparatory stage.*—There were in all 407 plots in which the selected participants reported cultivating high yielding paddy varieties. Preparatory ploughing up to 6 to 8 times was recommended for these varieties. As in the kharif season the sample participants reported the use of tractor, iron plough and desi plough for carrying out the preparatory ploughings. Because of its better efficiency, ploughing with tractor even once and ploughing with iron plough up to 4 to 6 times can be considered sufficient to obtain good tilth of the soils. According to this standard, only 23.1 per cent of the plots could be considered as having been ploughed to the recommended level. The tractor and iron plough were used by proportionately larger number of bigger cultivators, who, for obvious reasons, derived better economies. In regard to hybrid jowar plots less than one tenth of the plots only had received the recommended level of ploughings. Judging by the depth of ploughing recommended (up to 6" more relevant for jowar than paddy) the performance was better than the kharif season in as much as 38.5 per cent of the plots came up to this standard.

7.7. The use of plank was reported by slightly more than half the plots for both paddy and jowar. But the use was observed more in the case of larger paddy cultivators while no such trend was found in the case of jowar. The basal application of pesticides was relevant for jowar plots only and this was mainly reported in Mysore. On the other hand, the green manuring practice was observed only for paddy plots, mostly in the four southern States (Appendix Table 7.6).

Basal application of chemical fertilisers

7.8. *High yielding paddy.*—The adoption of recommended dosages of the chemical fertilisers in the cultivation of the high yielding varieties at different stages are crucial for realising the potential of these varieties. A basal dose of 120 to 150 kg. of Amonium sulphate, 125 to 175 kgs. of Super phosphate and 25 to 30 kg. of Muriate of Potash constitute the recommendation at this stage. Only in the case of ADT-27 a lower dose of up to 70 kg. Amonium sulphate is recommended while a lesser dose of upto 60 kg. of Super was indicated for Tainan-3. Against these broad recommendations, non-application of chemical fertilisers was reported for about a fifth of the paddy plots. The application of nitrogenous fertilisers was reported for two-thirds of the plots at an average dose of 84.2 kg. per acre in terms of Amonium Sulphate. More than 100 kg. per acre was reported for about 28 per cent of the plots. (However, in the selected areas of Madras the use of fertiliser mixtures was reported for more than a quarter of the plots with an average dose of 92 kg. per acre). Thus compared to about two-fifths of the plots receiving nitrogenous fertilisers in the kharif season, this season's performance was better both in terms of the proportion of plots covered and the average dose applied.

7.9. In regard to the application of phosphatic and potassic types also, the adoption was relatively better in this season compared to kharif. As against 35 per cent of the plots reporting phosphatic types at an average of 90 kg. per acre in terms of Super during kharif, 57 per cent of the plots reported super application at an average dose of 105 kg. in this season. About a tenth of the plots only were given K_2O in kharif whereas this season's adoption extended to 29 per cent of the plots. This trend observed in almost all the selected areas is quite encouraging.

7.10. *Hydrid jowar.*—The fertiliser recommendations for basal application for hybrid jowar consist of up to 150 kg. per acre of Amonium Sulphate and Super each, and 25 kg. of Muriate of Potash. About a quarter of the jowar plots had not received any application of chemical fertilisers. Nitrogenous fertilisers were applied for about a third of the plots at an average dose of 82 kg. Amonium Sulphate per acre. The application of the other two types was still less, at about a quarter of the plots given Super at an average dose of 86 kg. and less than a fifth of the plots given Muriate of Potash at an average dose of 37 kg. per acre. But 42 per cent of the plots were applied with fertiliser mixtures exclusively at an average dose of 127 kg. per acre, which can be considered to have effectively substituted for the straight fertilisers. Such use of mixtures was particularly significant in Maharashtra State. On the whole, the application of chemical fertilisers for this crop in the current season was marginally better compared to kharif. (For details please see Appendix Table 7.7).

Paddy nurseries and Transplanting operations :

7.11. The use of treated seed was reported in slightly more than half the cases for sowing operations. The seed obtained from the local cultivators was mainly untreated. A large proportion of nurseries were raised on traditional lines and only about 13 per cent of them were recommended raised seed beds, which was also the extent of adoption in the kharif season. But the application of chemical fertilisers at the nursery stage was almost universal unlike in the kharif season. Plant Protection measures were also taken for the nurseries on a significantly larger scale during this season. (Appendix Table 7.8).

7.12. Transplanting operations were reported for about 97 per cent of the plots; but among them for more than a quarter, late transplanting beyond 35 days was reported, particularly from the selected areas of West Bengal. Regarding spacing, closer distance between rows and more spacing between the plants than the recommendations was observed. However, the deficiencies in spacing would have been set right to some extent during the interculture operations particularly weeding. (Appendix Table 7.9).

Sowing operations for hybrid jowar

7.13. Treated seed up to 5 kg. per acre is recommended to be sown shallow at not more than 2 inches deep. In all cases of sowings only treated seed was reported to have been used by the selected participants but the seed rate used was observed to be generally below the recommended level in 82 out of 86 cases. While shallow sowing as recommended was more general in Maharashtra, sowing at more than 3 inches deep was prevalent in the selected areas of Mysore. Closer spacing than recommended was reported from both the States though there was a good amount of non-response regarding this aspect from the respondents. Since proper spacing as between rows and plants constitutes one of the important recommendations, there seems to be need for driving home to the cultivators the usefulness of this practice. (Appendix Table 7.10).

Interculture operations and top dressing with fertilisers :

7.14. About nine-tenths of the relevant paddy plots had received various interculture operations including for a seventh of them reporting operations more than once. This coverage was slightly better compared to kharif season. Against the broad recommendation of 70 kg. of Amonium Sulphate per acre for top dressing, the average dose applied for about four-fifths of the plots came to 123 kg. However, about a quarter of the plots only received the dose at more than 100 kg. This higher dosage for top dressing, in a way, compensated for the lower dosage given at a stage of basal application. A similar trend was also observed in the kharif season. Regarding hybrid jowar, the performance regarding interculture and top dressing with fertilisers was observed to be relatively better in this rabi compared to kharif season. Interculture operations were taken up in nearly all the plots and for about a third of them such operations were reported twice. Top dressing with chemical fertilisers was reported for 77 plots at an average of 112 kg. of Amonium Sulphate per acre. (For particulars please refer to Appendix Table 7.11).

Plant protection measures :

7.15. The preventive plant protection measures were reported to have been taken by slightly more than half the participants of high yielding paddy varieties as against 25 per cent only in the kharif season. This adoption was, however, observed to be relatively on a lesser scale in Orissa, Madras and Mysore. About 36 per cent of the participants reported attack of pests/diseases compared to about 46 per cent during the kharif season. But relatively larger proportion of participants in A.P., Kerala and Madras reported pest attack in rabi compared to kharif while in the remaining three States the attack was less. More than 90 per cent of the relevant participants took curative measures in the relevant States except in Madras and Orissa and the measures were also reported to be generally effective in controlling the pests.

7.16. For hybrid jowar also, preventive measures were reported to have been taken by more than two-thirds of the selected participants which was more than double that in the kharif season. In the two relevant States, this proportion was much higher in Maharashtra compared to Mysore and possibly due to such precautionary measures the outbreak of pests/diseases was reported less in Maharashtra (44 p.c.) compared to Mysore (94 p.c.). But the curative measures were adopted by all the relevant cultivators in the selected areas of Maharashtra while for the participants of Mysore this proportion was less than two-thirds. The control of the outbreak of pests/diseases by curative measures was reported to be less effective for hybrid jowar (for about a fifth of the cases) compared to the high yielding paddy varieties. Thus, there seems to be the need for greater emphasis on preventive measures in the case of hybrid jowar crop. (Appendix Table 7.12).

Irrigation and Water Management

7.17. Canal was the main source of irrigation both for paddy and jowar accounting for 78 per cent and 67 per cent, respectively, of the relevant crops. The next important source was well including well fitted with oil engines and motors. Significant proportion of plots reporting irrigation by tanks and other sources was only in West Bengal and Kerala. Regarding the adequacy of irrigation, about a fifth of the paddy plots reported insufficient irrigation and this proportion was about a tenth only for jowar. The problem of inadequate irrigation was reported relatively more in the selected areas of Kerala and Madras and to some extent in West Bengal. (For details please see Appendix Table 7.13). The scientific water management, particularly maintenance of suitable water levels at different stages of crop growth in regard to paddy was not yet well known in the field. However, for hybrid jowar the number of irrigations is an important factor affecting the output. The Table below gives the distribution of plots according to number of irrigations given :—

Table VII-1 Percentage distribution of hybrid jowar plots by number of irrigations given:

State	1 to 2 irrigations	3 irrigations	4 irrigations	5 irrigations or more
Maharashtra	9·1	14·5	30·9	45·5
Mysore	—	—	—	100·0
All States	5·5	8·9	18·9	66·7

Adoption of 'package' of practices by participants

7.18. The recommendations in regard to various practices as enumerated above in the earlier paragraphs were to be adopted as a 'package'. The analysis so far was mainly regarding the extent of adoption of each of the individual items of the 'package' against the recommendations. It would, however, be more useful to present this picture of adoption in combination. As in our earlier reports irrespective of the level or area of adoption, the participant who reported the adoption of a particular measure in the cultivation of these varieties was treated as adopting the input/practice in question. For this purpose four important items were chosen, *viz.* seed treatment, chemical fertilisers, preventive plant protection measures and inter-culture operations. These constitute the 'core' of the 'Package'. For those using chemical fertilisers, further analysis regarding the application of N, P and K types in various combinations was also attempted. However, use of mixture grades, was excluded from the purview of 'chemical fertilisers'.

7.19. *High yielding paddy varieties.*—About a third (32 p.c.) of the selected participants reported adoption of the above four mentioned recommended items in combination. This proportion was only about a fifth during the kharif season. The extent of adoption in combination increased with the size of operational holding of the participants. But, among the smaller cultivators also, such adoption appreciably improved compared to the last kharif season. Statewise, the proportion ranged from 40 to 50 per cent in three States while in the other three, *viz.* Madras, Orissa and Mysore the proportion was low. Compared to the last kharif this proportion improved in the selected areas of all the States except in Madras and Orissa. Excluding seed treatment, the other three items, *i.e.*, application of chemical fertilisers, adoption of preventive plant protection measures and inter-culture operations, (the next important combination for growing paddy) in combination, was reported by another fifth of the partcipants. However, combined adoption of chemical fertilisers and preventive plant protection measures to the exclusion of other items was not reported by any significant proportion of the participants; but chemical fertilisers and inter-culture operations was observed to be a more popular combination.

7.20. The use of chemical fertilisers was reported by about 92 per cent of the participants, and this proportion was about the same as in kharif season. But the use of N, P and K in combination recorded a substantial increase in the current season (about 19 p.c.) compared to last kharif (9 p.c.). This proportion would further improve if we take into consideration the significant use of mixed fertilisers reported from some of the areas in Madras, A.P. and Kerala. The adoption of N and P in combination was reported by another 30.5 per cent of the participants. The use of N and P to the exclusion of K was found to be more prevalent in A.P. and Mysore while in Orissa N+P+K as well as N+P were adopted on a significant scale.

7.21. *Hybrid jowar.*—The adoption of the four items in combination was reported by 72 per cent of the participants and this proportion more than doubled for Mysore and increased five-fold in Maharashtra compared to kharif season. This adoption was uniformly good for all classes of cultivators, compared to kharif when larger proportions were observed among participants with larger operational holding. The use of chemical fertilisers was reported by 92 per cent of the participants during this season compared to 96 per cent in the kharif season. In the selected areas of Mysore this proportion remained the same during the two seasons but the proportion using N+P+K or N+P alone increased from 50 per cent to 58 per cent mainly due to the increased adoption of N+P rather than the three types in combination that was prevalent earlier. In Maharashtra, on the other hand, the use of mixed fertilisers was more significant, ensuring balanced application of the nutrients. (For further details Appendix Table 7.14 may be seen).

CHAPTER VIII

CULTIVATION EXPENSES, YIELD LEVELS AND VIEWS OF PARTICIPANTS, ETC.

Cultivation expenses

8.1. *High yielding paddy varieties.*—Expenditure incurred on current material inputs and labour was ascertained from the selected participants in the cultivation of the high yielding varieties as well as other crops. This information was collected at three points of time during the season and consisted of expenditure on seed, fertilisers, plant protection, labour charges, irrigation, etc. The per acre expenditure on these items for the cultivation of high yielding paddy varieties worked out to Rs. 333, while for other crops, it was Rs. 91 only. Of this expenditure about 43 per cent each was accounted by fertiliser and labour charges while the expenditure on other items like seed, plant protection, etc. was less than five per cent each of the total expenditure. The per acre expenditure for H.Y. paddy was appreciably higher in Orissa but lower in Madras in the rabi compared to kharif season.

8.2. Statewise, the per acre expenditure for H.Y. paddy was the highest in Kerala (Rs. 446) followed by Mysore (Rs. 377), West Bengal (Rs. 374) and A.P. (Rs. 329). In Madras and Orissa the expenditure was less than Rs. 300. Of the two important components of this expenditure, labour charges at more than Rs. 150 per acre was reported for the selected areas of Kerala, West Bengal and A.P. while on an average more than Rs. 150 worth of fertilisers per acre were applied in Kerala, Mysore and West Bengal. About 52 per cent of the selected participants reported an average per acre expenditure of over Rs. 300 including a tenth reporting more than Rs. 500. Broadly, with increased per acre expenditure, the value of the gross harvested produce also increased as can be seen from the following abstract :

Table VIII-1. Percentage distribution of participants by cash inputs and value of gross harvested produce per acre for H.Y. Paddy.

Value of cash inputs in Rs.	Value of gross harvested produce in Rs.						
	300 or less	301-500	501-750	751-1000	1001-1500	1501 & above	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0-100	46·7	—	13·3	33·3	6·7	—	100·0(6·4)
101-200	17·1	31·4	14·3	2·9	28·6	5·7	100·0(14·9)
201-300	6·3	21·9	21·9	6·2	25·0	18·7	100·0(27·2)
301-500	5·1	4·1	15·3	16·3	37·8	21·4	100·0(41·7)
501 & above	4·3	—	4·4	8·7	43·5	39·1	100·0(9·8)
All Groups	9·8	12·3	15·8	11·9	31·5	18·7	100·0(100·0)

8.3. *Hybrid jowar.*—The per acre expenditure for the cultivation of hybrid jowar was Rs. 376, about double that reported in the kharif season. This was mainly due to increased expenditure reported from the selected areas of Maharashtra during the current season (Rs. 407) compared to kharif

(Rs. 191) while in Mysore the expenditure during both the seasons was around Rs. 350. This situation in Maharashtra may be partially due to the participants as a group having relatively bigger land holdings and the cultivation done under irrigated rather than rainfed conditions as in kharif, necessitating larger doses of inputs. Thus the average per acre expenditure in Maharashtra was higher by about 70 per cent for fertilisers and more than 100 per cent for labour compared to kharif. In the cultivation of hybrid jowar also the main items of expenditure were fertilisers and labour, each claiming about 40 per cent of the total. More than 70 per cent of the selected participants reported expenditure over Rs. 300 per acre including a quarter reporting more than Rs. 500 expenditure. The value of gross harvested produce were broadly observed to have been associated with increased per acre expenditure on the inputs, but to a lesser extent than in the case of paddy as can be seen from the abstract below :

Table VIII-2. Percentage distribution of participants by cash inputs and value of gross harvested produce per acre for hybrid jowar.

Value of cash inputs in Rs.	Value of gross harvested produce in Rs.					
	300 or less	301-500	501-750	751-1000	1001-1500	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0-100	100·0	—	—	—	—	100·0(3·5)
101-200	50·0	20·0	30·0	—	—	100·0(11·6)
201-300	36·4	9·1	36·4	18·2	—	100·0(12·8)
301-500	28·2	33·3	23·1	10·3	5·1	100·0(43·4)
501 & above	26·1	21·7	30·4	13·0	8·7	100·0(26·7)
All groups :	33·7	24·4	26·7	10·5	4·7	100·0(100·0)

The yield levels

8.4. The actual yields (after the completion of harvesting and threshing operations) were ascertained from the selected participants for the high yielding varieties grown in their holdings during the season. The yield levels reported during this rabi season were quite encouraging and substantially higher compared to kharif both for high yielding paddy varieties and hybrid jowar. The climate relatively being less humid with less monsoon winds and precipitation, rabi season appears to be more propitious for growing these varieties. Besides, controlled irrigation which is recommended for these varieties was possible during this season compared to the monsoon kharif months. But irrigation is severe constraint in the rabi season and hence acts as a limiting factor to achieve larger coverage of irrigated crops in general and the adoption of high yielding varieties, in particular. This was probably responsible for the limited coverage under the H.V.P. in the selected areas, as noted earlier. The response of some of these paddy varieties seems to be far better in the rabi compared to the kharif largely because of the climatic and other seasonable advantages. Our data also point out that the performance of the same varieties in different States varied considerably. Thus the varieties that could be successfully cultivated as between these two main seasons as also their suitability in different regions is a matter that needs further investigation and research by the technical experts. In order to derive the maximum benefit out of the existing varieties particularly the exotic ones (T.N.I and I.R.-8) it may be necessary to link up this programme effectively to areas where minor irrigation facilities (wells, tubewells etc.) already exist and also where intensive programmes of minor irrigation are being undertaken.

8.5. *High yielding paddy varieties.*—An average yield of 17.1 quintals per acre was recorded for over 253 harvests of the high yielding paddy varieties of the selected participants for this season. This average was higher by more than 75 per cent compared to kharif. Higher yields of more than 30 quintals per acre were reported in four harvesting cases while in 71 other harvests the yield was more than 20 quintals and up to 30 quintals. The yield levels were uniformly good for all size group of cultivators but with a marginally better performance with increased size of operational holding of the participants. The Table below gives the distribution of harvests by per acre yield ranges for the selected participants :

Table VIII-3. Distribution of harvests by per acre yields according to size of operational holding of the participants

Yield range in Qtls. per acre	Distribution of harvests according to size of operational holding in acres.						
	Below 2·5	2·5 to 5·0	5·0 to 10·0	10·0 to 20·0	20·0 to 50·0	50·0 & above	All Sizes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8
10·0 or less	16	11	16	8	11	—	62
10·0 to 20·0	4	[illegible]	[illegible]	19	9	1	116
20·0 to 30·0	[illegible]	[illegible]	[illegible]	10	13	—	71
30·0 to 40·0	[illegible]	[illegible]	[illegible]	—	—	—	4
Av. yield	14·[illegible]	[illegible]	[illegible]	16·8	17·6	18·7	17·1

8.6. As in the kharif, there was considerable variation in the yield levels as between the selected areas of different States. The highest average was recorded for the participants of Orissa (21.7 Q.), followed by West Bengal (17.7 Q.), A.P. (17.6 Q.) and Mysore (15.8 Q). The average yield was relatively quite low in Madras (11.8 Q.) and Kerala (11.0 Q). But in all these States the yield was much higher in this season compared to Kharif and was of the order of more than 25 and up to 34 per cent in Madras, A.P., Kerala and West Bengal. In Mysore, the average yield increase worked out to more than 150 per cent while in Orissa the increase was more than four fold to that in kharif season. Quite a number of cases of very good yields of more than 20 q. per acre were observed in all the selected areas. Thus, these varieties established a better record as high yielders in the rabi in all the selected areas.

8.7. Variety-wise, the highest average yield was recorded for I.R.-8 (20.7 Q.). Even Taichung Native-I which did not fare well in the last kharif gave a good account with 17.1 Q. average yield per acre. On the other hand, ADT-27 again showed the same average yield level of 9.3 Q. in a way confirming our earlier kharif observation that this variety was probably not genetically as superior as some of the other varieties. But the performance of T.N.-I in rabi was quite significant recording about 120 per cent increase in the yield compared to kharif. Its performance was uniformly good in all the selected areas (except Kerala) and particularly in Orissa. I.R. -8 variety, however, maintained its lead in this season also with an average increase in yield rate of more than 25 per cent over kharif. On the whole, Orissa gave the best record of performance of all these varieties in rabi followed by West Bengal, A.P. and Mysore in that order.

8.8. The better performance of the high yielding paddy varieties in this season was no less due to the relatively lesser incidence of pests/diseases and other adverse factors like lodging, shedding, etc. Compared to about 44 per cent of the kharif harvests reporting pest attack with an average loss of produce to the same extent, in this season pest attack was reported in 26 per cent of the cases only with an average loss of produce estimated for them at about 17 per cent. Particularly in Orissa where much havoc was wrought by pests/diseases in the kharif resulting in heavy damage to the crop, in this season the crop was free from this menace thereby promoting good yields. However, pest attack to a significant extent was reported from the selected areas of A.P., Madras and West Bengal. Variety-wise, the incidence of pests/diseases was relatively more for ADT-27 and TN-1 compared to IR-8. While the problem of lodging was not severe, shedding was repor'ed for about 18 per cent of the harvests but with a consequent loss of produce of slightly more than 10 per cent for these cases.

8.9. *Hybrid jowar.*—The average yield for 84 harvests of the selected participants for hybrid jowar worked out to 8.9 quintals in rabi compared to 3.2 Q. in kharif. This substantial stepping up of yield level was mainly due to better performance of the variety in Maharashtra where the average yield recorded a three-fold increase compared to kharif. In the selected areas of Mysore also there was a marginal increase in yield level by about 18 per cent during this season. The yield levels were uniformly good for all size groups of cultivators as can be seen from the Table below :

Table VIII-4. Distribution of harvests by per acre yield and size of operational holding of participants.

Yield range in Qtls. per acre	Distribution of harvests according to size of operational holding of the participants.						
	Below 2·5 acres	2·5 to 5·0 acres	5·0 to 10·0 acres	10·0 to 20·0 acres	20·0 to 50·0 acres	50·0 acres & above	All sizes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
10 Q. or less	2	6	8	16	18	9	59
10 to 20 Q.	3	1	5	5	7	3	24
20 to 30 Q.	—	—	—	—	1	—	1
Av. yield	11·9	5·7	10·7	7·4	8·4	9·5	8·9

8.10. The pest attack was reported during this season in three-fifths of the cases with an estimated loss of produce to the extent of 28 per cent. The pest attack was, however, marginally less during rabi compared to kharif in the selected areas of both the relevant States minimising the loss of produce consequently. But the increased average levels of yields for this season was mainly due to better adoption of recommended practices on the one hand and the better crop climate, particularly in Maharashtra.

The views of participants, suggestions for improvement etc.

8.11. The general performance of the varieties for both paddy and jowar was quite encouraging as noted earlier. But significant variations on various aspects of the cultivation of these varieties were reported by the selected participants. More than two-thirds of the participants were convinced of the higher yield potentiality of these varieties even though a lesser proportion of the relevant participants reported on this aspect for ADT-27. No-lodging and short duration characteristics of these varieties were also quite well appreciated. But about a fifth of the participants complained of high costs if cultivation and about a tenth of them were unhappy about the low market price for these varieties. The Table below gives the percentage of participants according to their views on the performance of the varieties :

Table VIII-5. Percent of participants reporting on various items of performance of H.Y. varieties

Main items of performance	Percentage of relevant participants reporting on				
	High yielding paddy varieties				
	T.N.-I	ADT-27	IR-8	All varieties	Hybrid jowar
(1)	(2)	(3)	(4)	(5)	(6)
Higher yield	73·7	46·2	72·5	67·6	71·4
Non-lodging	11·4	—	9·2	8·3	2·4
Short duration	0·9	21·2	7·1	7·6	17·9
High cultivation costs	24·6	32·7	8·2	20·0	11·9
More susceptable to pests/ diseases	14·0	11·5	4·1	9·8	35·7
No substantial increase in yields.	12·3	11·5	9·2	10·9	15·5
Low market price/poor grain quality	6·1	7·7	13·3	9·1	16·7

8.12. The problems of the participants in the cultivation of these varieties were also examined to some extent. In regard to both paddy and jowar varieties, the problem of pest attack was the most serious one followed by the difficulties of marketing. The other important problem was that of credit for the cultivation of these varieties. Labour shortage probably of the skilled type was also keenly felt in the selected areas of Orissa, Maharashtra and Mysore. On the other hand, the supply position regarding seeds, chemical fertilisers etc. was relatively better during the season. For paddy varieties, problems like poor germination and early flowering still persisted and need to be tackled satisfactorily.

8.13. More than three-fourths of the selected participants of this season were willing to continue the cultivation of high yielding paddy varieties. This proportion was substantially lower for the selected participants in Mysore (25.0 p.c.). About 87 per cent of the participants growing hybrid jowar in Maharashtra and 71 per cent in Mysore wanted to continue these varieties. The Table below gives the percentage proportion of participants reporting willingness to continue the cultivation of these varieties and those not willing by reasons for the same :

Table VIII-6 Percentage of participants intending to continue and those not intending to continue the varieties with reasons thereto.

Crop	State	Percentage preportion of selected participants					
		Willing to continue	Not willing to continue	Reasons for not continuing			
				Costly inputs and labour	More susceptable to pests/diseases	No local market/preference for produce	Other reasons
(1)	2)	(3)	(4)	(5)	(6)	(7)	(8)
Paddy	A.P.	74·6	25·4	6·0	10·4	4·5	22·4
	Kerala	100·0	—	—	—	—	—
	Madras	78·1	21·9	9·4	6·3	3·1	12·5
	Mysore	25·0	75·0	20·8	45·8	4·2	50·0
	Orissa	77·1	22·9	2·9	17·1	—	17·1
	W. Bengal	96·4	3·6	—	—	—	3·6
	All States	78·0	22·0	5·5	11·0	2·1	16·5
Jowar	Maharashtra	87·3	12·7	9·1	7·3	—	9·1
	Mysore	71·0	29·0	22·6	29·0	—	9·7
	All States	81·4	18·6	14·0	15·1	—	9·3

8.14. The main reason for not continuing the cultivation of these varieties for both paddy and jowar was due to these being more susceptable to pests/diseases. This was particularly so for the paddy varieties in Mysore and Orissa and for jowar in both the relevant States. The other important reason was the costly inputs and labour involved in their cultivation. Relatively larger proportion of participants (about three-fourths) for hybrid jowar reported this reason for discontinuing compared to the intended drop-outs for high yielding paddy varieties (about a fourth). This problem, perhaps could be effectively tackled by extending timely credit on a large scale. The problem of high susceptability of the varieties for pests/diseases calls for more intensive field investigation and research for evolving pest resistant varieties. Organising prophylactic plant protection measures on a large scale would also minimise the incidence of such pests/diseases.

8.15. In conclusion, it can be stated that the H.V. Programme in the rabi season for both the paddy and jowar varieties was relatively more successful. Although the coverage of area was limited because of the constraints of irrigation, lack of rainfall etc., the performance of the varieties during the rabi compared to the kharif, was very much better. Besides the seasonal advantages, the efficiency in the organisation of input supplies and credit leading to better standards of cultivation seems to have contributed a great deal for the higher yields recorded in this season for all these varieties.

The adoption of the recommended practices in the cultivation of both paddy and jowar varieties in terms of preparatory ploughing, application of chemical fertilisers, interculture operations, plant protection measures, etc. was observed to be better in this season compared to the kharif. Adoption of these practices in combination was reported by a larger proportion of the participants in this season. The average cash expenditure per acre was also higher for this season compared to kharif. The average yield increase per acre for the selected participants was over 75 p.c. for high yielding paddy and more than 150 p.c. for hybrid jowar compared to the kharif season. Thus the foregoing analysis on the various aspects of the cultivation of these varieties clearly brings out the need for better exploitation of the potentialities of these varieties in the rabi season by an effective linkage of the programme to areas served by minor irrigation sources as well as areas enjoying canal irrigation during this season. Concentration of efforts in such areas rather than universalising the programme is bound to prove much more rewarding.

सत्यमेव जयते

APPENDIX I

List of selected Districts and Blocks

Crop	State	District	Block
Wheat	1. Bihar	Gaya	Arwal
,,	2. Haryana	Hissar	Hissar I
		Rohtak	Ganaur
,,	3. Maharashtra	Ahmednagar	Kopargaon
,,	4. Punjab	Amritsar	Jandiala
		Ludhiana	Ludhiana
		Ferozepur	Moga I
		Patiala	Patiala
,,	5. Rajasthan	Sri Ganganagar	Sri Ganganagar
,,	6. U.P.	Basti	Basti Sadar
		Muzaffarnagar	Budhana
		Aligarh	Khair
		Saharanpur	Deoband
		Sitapur	Biswan
		Allahabad	Phoolpur
Paddy	1. Andhra Pradesh	Nellore	Kovur.
		Krishna	Mandavalli
		West Godavri	Podura
,,	2. Kerala	Palghat	Coynlamannam
		Trichur	Pazhayannu
,,	3. Madras	North Arcot	Thurinjapuram
,,	4. Mysore	Shrimoga	Shimoga
,,	5. Orissa	Sambalpur	Attabira
,,	6. West Bengal	Burdwan	Burdwan
		Hoogly	Dhauiakhali
Jowar	1. Maharashtra	Aurangabad	Sillod
		Poona	Baramati
		Sholapur	Malshiras
,,	2. Mysore	Raichur	Sindhnur

APPENDIX II

TableNo.	
1 ·1	Trials and demonstrations conducted in the selected wheat blocks and villages for H.Y.P. in the year before the introduction of the Programme and in 1966-67.
1 ·2	Staff strength and transfers of extension personnel in the selected blocks (wheat) before the year of introduction of the programme, during 1966-67 and 1967-68.
1 ·3	Training camps held and number of participants (officials and cultivators) attending during the year 1966-67 and 1967-68 in the selected blocks.
1 ·4	No of selected villages reporting visits of Extension personnel and average no. of visits in the Rabi season of 1966-67.
2 ·1	Targets and achievements of the area under H.V.P. Wheat during Rabi 1966-67 and area targetted during Rabi 1967-68, State-wise.
2 ·2	Land utilisation particulars in the selected Blocks during Rabi seasons of 1965-66, 1966-67 and 1967-68.
2 ·3	Coverage of High Yielding Varieties of wheat in the selected Blocks during Rabi, 1966-67 and 1967-68.
2 ·4	Land utilisation particulars and area under High Yielding Varieties in the selected villages during the Rabi season 1966-67 and 1967-68.
2 ·5	Distribution points functioning in the selected Blocks for the supply of agricultural inputs during 1966-67 and 1967-68, agency-wise.
2 ·6	Quantity of High Yielding Seed of wheat obtained and distributed in the selected blocks during 1966-67 and 1967-68.
2 ·7	Supply of H.V. seeds of wheat, agency-wise, for 1967-68 in the selected villages.
2 ·8	Percentage distribution of cases of H.Y. seed obtained by selected participants by source, mode of payment; etc.
2 ·9	Supply of credit in the selected blocks during 1966-67 and 1967-68.
2 ·10	Supply of credit in the selected villages, agency-wise.
2 ·11	Percentage proportion of participants and non-participants covered by the cooperatives in the selected villages according to size of cultivation holdings.
2 ·12	No. of selected participants and the amount of credit obtained from various sources during Rabi season of 1966-67 and 1967-68.
3 ·1	Percentage proportion of cultivators participating in the programme and the number of selected participants by size group of operational holdings.
3 ·2	Distribution of respondents by the agency approaching them for taking up the H.Y. Varieties Programme.
3 ·3	Distribution of respondents who have seen trials/demonstrations by the year of seeing and where seeing.
3 ·4	Percentage of selected participants adopting the H.Y. Varieties by year of adoption and the area under H.Y.P. during the year of adoption and the last two years.
3 ·5	Average cultivation holding and areas under H.Y.P. and other improved varieties.
3 ·6	Distribution of plots by the extent of ploughing and adoption of other improved practices.
3 ·7	Distribution of plots according to basal doses of fertilisers.
3 ·8	Percentage distribution of sowing of H.Y. Wheat by seed rate, method of sowing; etc.
3 ·9	Percentage distribution of plots by interculture operation, etc.
3 ·10	Distribution of respondents adopting various preventive and curative measures.
3 ·11	Distribution of irrigation sources owned by selected participants and by the period of acquisition.
3 ·12	Percentage distribution of plots by sources of irrigation.
4 ·1	Average cash expenditure (in Rs.) on inputs per acre for H.Y. Wheat and non-H.Y. holding of the participants.

4·2 Distribution of harvests by per acre yield in quintals for the selected participants.

4·3 Distribution of participants growing H.Y. and other local varieties of wheat according to the level of yield.

4·4 Distribution of harvesting cases by average yield per acre and according to various losses reported.

5·1 Percentage distribution of participant cultivators, views regarding the performance of H.V.P.

5.2 Distribution of selected participant cultivators according to problems reported on various aspects of H.V.P.

5·3 Distribution of participant cultivators willing to continue the H.Y. variety according to reasons.

5·4 Distribution of non-participant cultivators size/group-wise.

5·5 Distribution of non-participant cultivators by sources through which they have come to know of H.Y.V.P.

5·6 Distribution of non-participants according to views on performance of H.Y. varieties of wheat.

5·7 Distribution of non-participants by reasons for non-adoption.

5·8 Distribution of non-participants by reasons for not taking up the programme during the next season.

6·1 Supply of H.V. Seed in selected villages and the sources of supply.

6·2 Distribution of selected respondents by the source of supply of seed and their mode of supply.

6·3 No. of selected participants and the amount of credit obtained from various sources during rabi seasons of 1966-67 and 1967-68.

7·1 Percentage proportion of cultivators adopting the H.Y. varieties in Rabi 1967-68 by size of operational holding.

7·2 Percentage of selected participants adopting H.Y. varieties during the Rabi season.

7·3 Average area under the H.Y. Varieties per selected participant and its proportion to average gross cropped area for the Rabi of 1966-67 & 1967-68.

7·4 Distribution of respondents by the agency approaching them for taking up.

7·5 Distribution of respondents who have seen trials/demonstrations by the year of seeing and when seen.

7·6 Distribution of plots by no. of ploughings, depth of ploughing, use of improved practices.

7·7 Distribution of plots according to basal doses of fertilisers by size group.

7·8 Distribution of Nurseries by method of raising seed beds and plant protection measures.

7·9 Distribution of plots by the age of plants at the time of transplanting, distance between rows, plants.

7·10 Distribution of sowing of Hybrid Jowar according to seed rate and method of sowing

7·11 Distribution of plants by the adoption of intercultural operations.

7·12 Distribution of participants adopting preventive and curative plant protection measures.

7·13 Distribution of plots by irrigation sources and extent of irrigation.

7·14 Distribution of participants by adoption of recommended practices in combinations (A: seed treatment; B: use of chemical fertilisers; C: Preventive Plant Protection & D: Inter-cultural operations).

8·1 Average cash expenditure on Inputs (in Rs.) per acre for H.V. and non-H.V. holdings of the participants crop-wise.

8·2 Distribution of harvests by per acre/Average yields (in quintals), cropwise.

8·3 Distribution of harvests by average yields per acre and loss reported due to various causes, cropwise and variety-wise.

8·4 Distribution of selected participant cultivators according to problems reported on viarious aspects of H.Y.V.P.—State-wise and crop-wise.

Table 1·1 : *Trials and demonstrations conducted in the selected Wheat Blocks and villages for H.Y.P. in the year before the introduction of the programme and in* 1966-67.

State	No. of Blocks reporting trials/demonstrations in		No. of trial/demonstrations laid in the relevant blocks in		No. of villages reporting trials/demonstrations in		No. of trials and demonstrations laid in the relevant villages in	
	Year before the introduction of the programme	1966-67	Year before the introduction of the programme	1966-67	Year before the introduction of the programme	1966-67	Year before the introduction of the programme	1966-67
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Bihar	—	1	—	20	—	1	—	1
2. Haryana	1	2	17	66	1	4	1	6
3. Maharashtra	—	1	—	7	—	—	—	—
4. Punjab	3	3	34	218	—	6	—	7
5. Rajasthan	1	1	5	15	1	3	1	3
6. U.P.	—	6	—	225	1	5	3	8
All States	5	14	56	551	3	19	5	25

TABLE 1·2: *Staff strength and transfers of extension personnel in the selected blocks (wheat) before the year of introduction of the programme, during* 1966-67 *and* 1967-68.

State	No. of selected Blocks	Postings and transfers of extension staff, category-wise.																	
		A.E.O.						Other Agricultural Staff						V.L.W.					
		Year before introduction		1966-67		1967-68		Year before introduction		1966-67		1967-68		Year before introduction		1966-67		1967-68	
		P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Bihar ..	.. 1	2	—	2	2	2	—	—	NR	—	NR	1	—	20	—	20	1	20	9
Haryana	.. 2	2	—	5	3	9	2	15	4	19	5	11	—	19	6	19	4	20	4
Maharashtra	.. 1	2	2	2	—	2	—	16	2	19	—	19	—	17	9	19	2	19	—
Punjab ..	.. 4	7	5	8	4	8	2	17	1	19	3	23	4	35	13	43	7	39	1
Rajasthan	.. 1	2	3	2	2	2	1	—	—	—	—	—	—	20	—	20	—	20	5
U.P. ..	.. 6	17	5	22	4	15	3	8	3	14	2	13	3	35	5	40	4	54	8
All States	..15	32	15	41	15	38	8	56	10	71	10	57	7	146	33	161	16	172	27
			(46·9)		(36·6)		(21·1)		(17·8)		(14·1)		(12·3)		(22·6)		(9·9)		(15·7)

P=Number posted.

T=Number transferred.

Note: (*i*) Figures in brackets are percentages against the totals of earlier column.

(*ii*) Data in case of VLW were not available for 3 Blocks of U.P. and for 'Other Agricultural staff' for one Block of U.P.

Table 1·3 : *Training camps held and number of participants (officials and cultivators) attending during the year* 1966-67 *and* 1967-68 *in the selected blocks for wheat.*

(Rabi only)

State	No. of selected blocks.	No. of training camps held in		No. of participants attending in			
		1966-67	1967-68	1966-67		1967-68	
				Officials'	Cultivators	Officials	Cultivators
1	2	3	4	5	6	7	8
1. Bihar	1	4	3	50	3,000	27	852
2. Haryana	2	N.A.	N.A.	65	1,650	102	2,738
3. Maharashtra	1	1	1	175	--	30	80
4. Punjab	4	26	54	38	1,880	38	2,917
5. Rajasthan	1	51	—	44	250	—	—
6. U.P.	6	N.A.	N.A.	357	8,966	411	16,502
All States	15	82	58	729	35,746	608	23,089

Table 1 ·4: *No. of selected villages wheat study reporting visits of Extension personnel and average number of their visits in the Rabi season of* 1966-67.

State	No. of selected villages	No. of villages having VLW Hqrs.	No. of villages reporting vists of				Average no. of visits undertaken by			
			BDO	EO (Ag.)	EO (Coop)	VLW (other than VLW Hqrs. villages)	BDO	AEO (Ag.)	EO (coop.)	VLW (other than VLW Hqrs. villages)
1	2	3	4	5	6	7	8	9	10	11
Bihar	3	Nil	1	1	—	3	2 ·0	5 ·0	NR	28 ·0
Haryana	6	4	6	6	6	2	2 ·8	4 ·3	5 ·5	14 ·5
Maharashtra	3	1	3	3	1	2	2 ·7	2 ·7	3 ·0	40 ·0
Punjab	12	3	8	11	10	9	1 ·5	2 ·9	2 ·2	7 ·6
Rajasthan	3	Nil	3	3	2	3	1 ·7	2 ·7	1 ·5	27 ·3
U.P.	18	6	14	18	13	12	3 ·1	3 ·6	3 ·1	28 ·5
All States	45	14	35 (77 ·8)	42 (93 ·3)	32 (71 ·1)	31 (100 ·0)	2 ·5	3 ·4	3 ·2	22 ·1

NOTE: Percentages in brackets for cols, 4, 5 and 6 are against col. 2 and for col, 7 against the non-headquarter villages i.e, col, 2-col. 3.

Table 2·1: *Targets and achievement of area under HVP Wheat during* 1966-67 *Rabi and area targetted during Rabi* 1967-68—*State-wise*

(Area in '000 acres)

State	Area achieved during Rabi 1966-67	Area achieved as % to area targetted	Area targetted during Rabi 1967-68	Area targetted in 1967-68 as% to area targetted in 1966-67 (Rabi)
(1)	(2)	(3)	(4)	(5)
Bihar	66	94·28	593	847·14
Haryana	70	162·79	200	465·12
Maharashtra	14	14·00	200	200·00
Punjab	141	71·17	1500	761·42
Rajasthan	24	102·44	300	1291·27
U.P.	897	99·67	3500	388·89
All States	1212	90·92	6293	427·09

Table 2·2—*Land utilisation particulars in the selected blocks for wheat during Rabi seasons of* 1965-66, 1966-67 *and* 1967-68

(Area in Acres)

State	Block	Net sown area	Grossed cropped area	Gross cropped area as % to net sown area	Net irrigated area	Net irrigated area as % to net sown area	1965-66		1966-67		1967-68	
							Area under food crops	Area under selected crop	Area under food crop	Area under selected crop	Area under food crops	Area under selected crops
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Bihar	Arwal	54,509	70,858	130·00	47,731	87·57	5,746	5,680	15,347	9,341	12,557	12,557
Haryana	1. Hissar	1,33,458	1.44,489	108·27	60,227	45·13	70,201	12,896	41,826	14,900	54,825	23,113
	2. Ganaur*	68,650	1,11,924	163·04	37,915	55·23	41,705	3,2000	44,757	34,987	N.A.	N.A.
Maharashtra	1. Ahmadnagar*	2,10,934	2,17,997	103·35	70,822	33·58	1,12,153	18,685	97,957	23,997	N.A.	N.A.
Punjab	1. Patiala	N.A.	N.A.	N.A.	N.A.	N.A.	12,122	12,122	13,850	13,850	15,750	15,750
	2. Jandiala*	20,087	24,223	120·59	1,88,225	93·72	10,206	9,742	10,485	10,080	N.A.	N.A.
	3. Moga* I	76,032	1,04,231	137·09	N.A.	N.A.	56,035	48,645	77,644	72,772	N.A.	N.A.
	4. Ludhiana*	76,075	1,52,498	200·46	N.A.	N.A.	73,744	60,902	78,782	67,940	N.A.	N.A.
Rajasthan	Ganganagar*	1,75,298	1,84,571	103·29	N.A.	N.A.	77,335	48,961	68,110	38,675	N.A.	N.A.
U.P.	1. Khair*	1,24,440	1,57,496	126·56	N.A.	N.A.	67,615	24,319	81,734	27,536	N.A.	N.A.
	2. Phulpur*	37,858	37,633	99·41	N.A.	N.A.	11,282	4,345	12,063	4,980	12,119	5,014
	3. Deoband*	53,796	77,349	143·78	N.A.	N.A.	27,379	14,231	31,646	20,044	N.A.	N.A.
	4. Budhana*	78.858	1,09,906	139·37	54,936	69·66	Nil	Nil	29,902	24,407	116	116
	5. Biswa*	88.335	1,09.214	123·64	3,681	26·81	21,947	18,248	34,546	24,816	60	60
	6. Basti Sadar*	44,449	63,538	142·95	38,881	81·47	20,353	18,193	25,750	23,423	N.A.	N.A.

*In the absence of data for 1967-68, data for 1966-67 have been reported for cols. 4 to 7.

TABLE 2·3—*Coverage of High Yielding Varieties of Wheat in the selected blocks during Rabi*—1966-67 *and* 1967-68

State	Name of the Block	Area under HYV in 1967-68 (in acres)	% increase in area over 1966-67	% area under HYVP to total area in 1966-67 (Rabi)		% of achievements to targets in	
				1966-67	1967-68	1966-67	1967-68
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bihar	Arwal	4,461	502·02	7·93	47·76	N.A.	111·53
Haryana	Hissar I	7,113	119·33	21·77	47·73	648·60	142·26
	Ganaur	6,130	283·12	4·57	17·52	106·67	102·17
Maharashtra	Ahmadnagar	44	—581·81	1·25	0·18	20·00	1·10
Punjab	Patiala	20,715	537·38	23·47	149·56	92·85	111·97
	Jandiala	23,425	1461·66	14·88	232·39	166·67	117·13
	Moga I	32,239	N.A.	N.A.	44·30	N.A.	107·46
	Ludhiana	29,075	869·16	4·42	42·80	N.A.	100·26
Rajasthan	Sriganganagar	25,000	614·28	9·05	64·64	107·69	109·41
U.P.	Khair	20,095	240·30	21·44	72·98	211·57	112·68
	Phulpur	4,205	557·03	12·85	84·44	172·97	135·64
	Deoband	5,852	991·79	2·67	29·20	97·45	104·89
	Budhana	11,660	793·49	5·67	47·78	55·40	137·17
	Biswan	2,832	68·71	6·29	11·51	107·22	46·00
	Basti Sadar	13,729	441·36	10·83	58·61	84·53	117·11

TABLE 2·4—*Land utilisation particulars and area under High Yielding Wheat varieties in the selected villages during the Rabi seasons of* 1966-67 *and* 1967-68.

(Area in acres)

State	No. of selected villages	No. of repor-ting villages	Net sown area	%of gross cropped area to net sown area	%of net irrigated to net sown area	1966-67				1967-68			
						%of food crops to total crop area	%of selec-ted crop area to food crop area	Under H.Y.P.		%of food crop to total crop area	%of selected crop area to total food crop area	Under H.Y.P.	
								Area	%to selected crop area			Area	%to selected crop area
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Bihar	3	3	962	176·51	76·51	90·95	23·88	26	12·4	91·59	46·99	124	39·7
Haryana	6	6	12,185	129·68	67·56	83·29	48·61	92	2·82	N.A.	N.A.	N.A.	N.A.
Maharashtra	3	Nil	6,088	102·58	76·02	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Punjab	12	9	18,283	136·04	38·32	75·97	97·72	710	6·52	77·97	97·58	54·82	37·24
Rajasthan	3	3	5,429	106·12	84·03	79·22	58·73	173	12·72	N.A.	N.A.	N.A.	N.A.
U.P.	18	12	11,198	147·38	63·83	89·31	59·85	394	10·34	91·90	69·04	884	61·90
All States	45	33	54,145	130·91	59·68	82·66	70·57	1,395	7·14	82·34	86·74	6,490	39·48

TABLE 2·5—*Distribution points functioning in the selected Blocks for wheat for the supply of agricultural inputs during* 1966-67 *and* 1967-68, *agency-wise.*

State	Year	Fertilisers						H.V. Seed					
		Coop.	Agri-Deptt.	V.L.W.	Village trader	Others	Total	Coop.	Agri-Deptt.	V.L.W.	Village Traders	Others	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Bihar	1966-67	18	—	—	2	—	20	—	—	20	—	—	20
	1967-68	18	—	—	2	—	20	—	—	20	—	—	20
Haryana	1966-67	55	—	—	—	—	55	30	Nil	—	—	—	30
	1967-68	63	—	—	—	—	63	6	5	—	—	—	11
Maharashtra	1966-67	4	—	—	—	—	4	Nil	—	—	—	21	21
	1967-68	3	—	—	—	—	3	3	—	—	—	23	26
Punjab	1966-67	139	—	—	—	—	139	27	6	5	—	—	38
	1967-68	141	—	—	—	—	141	28	6	5	—	—	39
Rajasthan	1966-67	23	—	—	Nil	—	23	—	1	20	Nil	1	22
	1967-68	16	—	—	11	—	27	—	1	15	1	1	18
U.P.	1966-67	66	33	—	—	3	102	61	20	—	—	—	81
	1967-68	69	44	—	—	3	116	58	35	—	—	—	93
All States	1966-67	305	33	—	2	3	343	118	27	45	Nil	22	212
	1967-68	310	44	—	13	3	370	95	47	40	1	24	207

TABLE 2·5—(*Contd.*)

State	Year	Pesticides						Equipment					
		Coop.	Agri-Deptt.	VLW	Village Traders	Others	Total	Coop.	Agri-Deptt.	VLW	Village Traders	Others	Total
(1)	(2)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
Bihar	1966-67	—	—	20	—	—	20	—	—	12	—	—	12
	1967-68	—	—	20	—	—	20	—	—	12	—	—	12
Haryana	1966-67	2	4	1	—	—	7	—	3	1	—	—	4
	1967-68	2	7	1	—	—	10	—	7	1	—	—	8
Maharashtra ..	1966-67	—	—	—	—	22	22	—	—	—	—	22	22
	1967-68	—	—	—	—	22	22	—	—	—	—	22	22
Punjab	1966-67	1	4	2	—	—	7	2	3	2	—	—	7
	1967-68	6	1	1	—	—	8	2	3	2	—	—	7
Rajasthan	1966-67	1	1	20	3	1	26	—	1	20	2	1	24
	1967-68	1	1	15	6	1	24	—	1	15	4	1	21
U.P.	1966-67	51	29	—	—	3	83	48	6	—	—	3	57
	1967-68	52	35	—	—	3	90	48	12	—	—	3	63
All States	1966-67	55	38	43	3	26	165	50	13	35	2	26	126
	1967-68	61	44	37	6	26	174	50	23	30	4	26	133

TABLE 2·6—*Quantity of High Yielding seed of wheat obtained and distributed in the selected blocks during* 1966-67 *and* 1967-68

(Quantity in Quintals)

State	Name of the Block	1966-67				1967-68			
		Quantity obtained (Locally+ from out-side the district)	Quantity distri-buted	Quantity distri-buted as% to quantity obtained	Reporting timely supply Yes/No	Quantity obtained (Locally+ from out-side the district)	Quantity distri-buted	Quantity distributed as % to quantity obtained	Reporting timely supply Yes/No
1	2	3	4	5	6	7	8	9	10
..	.. Arwal	225 ·50	225 ·50	100 ·00	Yes	6 ·00	6 ·00	100 ·00	Yes
Haryana ..	.. Hissar	701 ·59	701 ·59	100 ·00	Yes	645 ·07	645 ·07	100 ·00	Yes
	Ganaur	38 ·58	38 ·58	100 ·00	Yes	154 ·55	154 ·55	100 ·00	Yes
Maharashtra	.. Kopargaon	458 ·00	39 ·45	8 ·61	Yes	53 ·50	13 ·25	24 ·77	Yes
Punjab ..	.. Patiala	213 ·20	208 ·00	97 ·65	Yes	1,082 ·20	1,023 ·20	94 ·54	Yes
	Jandiala	397 ·60	397 ·60	100 ·00	Yes	1,593 ·02	953 ·32	59 ·84	Yes
	Moga I	150 ·00	150 ·00	100 ·00	Yes	1,403·00	1,403 ·00	100 ·00	Yes
	Ludhiana ...	735 ·00	735 ·00	100 ·00	Yes	245 ·60	205 ·60	83 ·71	Yes
Rajasthan ..	.. Sri ganganagar	501 ·00	501 ·00	100 ·00	Yes	1,578 ·76	1,433 ·96	90 ·83	Yes
U.P. ..	.. Khair	1,940 ·45	1,940 ·45	100 ·00	Yes	1,252 ·83	1,252 ·83	100 ·00	Yes
	Deoband	166 ·00	166 ·00	100 ·00	Yes	237 ·00	237 ·00	100 ·00	Yes
	Phulpur	177 ·00	177 ·00	100 ·00	Yes	144 ·00	144 ·00	100 ·00	Yes
	Budhana	420 ·25	420 ·25	100 ·00	Yes	664 ·30	664 ·30	100 ·00	Yes
	Biwan ...	360 ·85	360 ·85	100 ·00	Yes	553 ·96	553 ·96	100 ·00	Yes
	Basti Sadar	700 ·00	700 ·00	100 ·00	Yes	233 ·45	233 ·45	100 ·00	Yes
All States		7,185 ·02	6,761 ·47	94 ·10		9,847 ·24	8,922 ·49	90 ·61	

TABLE 2·7— *Supply of H. V. Seeds of Wheat, agency-wise, for* 1967-68 *in selected villages*

(Quantity in Quintals)

State	No. of selected villages	No. of reporting villages	No. of reporting timely supply	Qnty. distributed	Quantity supplied, source-wise, as % to total Qnty. distributed				
					Block/ Deptt.	Coop./ Panchayat	Registered grower	Progressive cultivator	Any other
1	2	3	4	5	6	7	8	9	10
Bihar	3	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Haryana	6	6	6	181·2	1·43	0·55	Nil	96·14	1·88
Maharashtra ..	3	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Punjab ..	12	12	12	3,156·0	47·53	4·47	Nil	6·65	41·85
Rajasthan	3	3	3	365·0	71·23	Nil	10·41	18·36	Nil
U.P.	18	18	18	573·5	47·03	35·81	6·97	10·00	0·19
All States	45	39	39	4,275·7	47·53	8·13	1·82	11·89	30·63

TABLE 2·8—*Percentage distribution of cases of H. Y. Wheat seed obtained by selected participants by source, mode of payment, etc.*

State	No. of cases of seed obtained	Block/Department							Village Cooperative/Panchayat						
		% to total	% distribution by mode of sale				% reporting		% to total	% distribution by mode of sale				% reporting	
			Cash	Credit	Exchange	Own supply	timely supply	Using treated seed		Cash	Credit	Exchange	Own supply	Timely supply	Using treated seed
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Bihar ..	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Haryana ..	57	5·26	100·00	—	—	—	100·00	66·67	3·51	100·00	—	—	—	100·00	—
Punjab ..	143	29·37	73·81	21·43	—	4·76	97·62	97·62	4·90	100·00	—	—	—	100·00	87·50
Rajasthan ..	23	17·39	75·00	—	—	—	100·00	100·00	—	—	—	—	—	—	—
U.P. ..	300	35·33	58·49	40·56	0·94	—	98·11	96·30	12·00	2·78	97·22	—	—	91·67	100·00
All States ..	535	28·97	63·87	33·55	0·65	1·29	98·06	96·18	8·41	22·22	77·38	—	—	93·33	93·48

TABLE 2·8—(*Contd.*)

State	No. of cases of seed obtained	Other cultivators						
		% to total	% distribution by mode of sale				% reporting	
			Cash	Credit	Exchange	Supply	Timely supply	Using treated seed
1	2	17	18	19	20	21	22	23
Bihar ..	12	100·00	75·00	—	25·00	—	91·66	91·66
Haryana	57	91·23	82·69	1·92	13·46	—	100·00	5·77
Punjab ..	143	65·73	79·79	1·06	19·15	—	95·74	51·58
Rajasthan ..	23	82·61	68·42	—	26·32	5·26	100·00	83·33
U.P. ..	300	52·67	32·28	12·03	54·43	—	96·84	54·38
All States ..	535	62·62	57·01	6·27	35·52	0·30	97·01	46·15

TABLE 2·9—*Supply of Credit in the selected blocks for wheat during* 1966-67 *and* 1967-68

(Amount in '000)

State	No. of Blocks reporting	Name of the Agency	Amount disbursed and No. of beneficiaries in					
			1966-67					
			H.V. Crops			All Crops		
			Amount disbursed	No. of beneficiaries	Amount disbursed, as % to Amount allotted	Amount disbursed	No. of beneficiaries	Amount disbursed as % to amount allotted
1	2	3	4	5	6	7	8	9
Bihar	1	Cooperative	—	—	—	74	875	100·00
		Department	126	1,230	92·16	184	1,459	94·48
		Total	126	1,230	92·16	258	2,334	95·99
Haryana	2	Cooperative	95	40	23·69	2,309	5,586	78·06
		Department	—	—	—	459	1,265	92·09
		Total	95	40	23·69	2,768	6,851	80·08
Maharashtra	1	Cooperative	21	63	100·00	N.A.	N.A.	N.A.
		Department	—	—	—	—	—	—
		Total	21	63	100·00	N.A.	N.A.	N.A.
Punjab	4	Cooperative	—	—	—	18,819	15,038	100·00
		Department	—	—	—	N.A.	N.A.	N.A.
		Total	—	—	—	18,819	15,038	100·00
Rajasthan	1	Cooperative	—	—	—	187	423	100·00
		Department	—	—	—	—	—	—
		Total	—	—	—	187	423	100·00
U.P.	6	Cooperative	93	1,267	100·00	1,512	18,152	100·00
		Department	578	7,609	96·82	1,016	15,557	96·43
		Total	671	8,876	97·25	2,528	33,713	98·53
All States	15	Cooperative	209	1,370	40·71	22,901	56,530	97·24
		Department	704	8,839	95·95	1,659	18,281	94·97
		Total	913	10,209	73·17	2,456	74,811	97·09

TABLE 2·9—(*Contd.*)

(Amount in '000)

State	No. of Blocks reporting	Name of the Agency	Amount disbursed and no. of beneficiaries in							
			1967-68							
			H.V. Crops				All crops			
			Amount disbursed	No. of beneficiaries		Amount disbursed as % to amount allotted	Amount disbursed	No. of beneficiaries		Amount disbursed as % to amount allotted
1	2	3	10	11		12	13	14		15
Bihar	1	Cooperative	—	—		—	113	1,015		100·00
		Department	181	1,247		78·36	181	1,247		78·36
		Total	181	1,247		78·36	294	2,262		85·47
Haryana	2	Cooperative	—	—		—	1,279	2,218		58·38
		Department	—	—		—	1,079	9,556		98·82
		Total	—	—		—	2,358	11,774		71·84
Maharashtra	1	Cooperative	89	109		100·00	N.A.	N.A.		N.A.
		Department	—	—		—	—	—		—
		Total	89	109		100·00	N.A.	N.A.		N.A.
Punjab	4	Cooperative	—	—		—	21,446	29,505		100·00
		Department	—	—		—	35	246		100·00
		Total	—	—		—	21,481	29,751		100·00
Rajasthan	1	Cooperative	N.A.	N.A.		N·A.	318	524		99·42
		Department	2	6		3·03	2	6		3·03
		Total	2	6		3·03	320	530		84·21
U.P.	6	Cooperative	1,335	10,976		100·00	2,933	27,283		100·00
		Department	2,248	17,236		94·89	2,646	22,144		95·63
		Total	3,583	28,212		96·73	5,579	99,427		97·88
All States	15	Cooperative	1,424	11,085	(809·12)	100·00	26,089	60,545	(107·10)	96·62
		Department	2,431	18,489	(209·18)	91·38	3,943	33,199	(181·60)	93·46
		Total	3,855	29,574	(289·68)	94·39	30,032	937,44	(125·31)	96·19

TABLE 2·10—*Supply of Credit in the selected villages for Wheat—agency-wise*

(Amount in '000)

State	No. of sample villages	1965-66 (Rabi)			1966-67 (Rabi)			1967-68 (Rabi)		
		Coop.	Deptt.	Total	Coop.	Deptt.	Total	Coop.	Deptt.	Total
1	2	3	4	5	6	7	8	9	10	11
Bihar	3	Nil	0·8 (5)	0·8 (5)	Nil	3·5 (36)	3·5 (36)	Nil	2·4 (18)	2·4 (18)
Haryana	6	92·0 (140)	Nil	92·0 (140)	95·2 (129)	Nil	95·2 (129)	29·7 (59)	Nil	29·7 (59)
Maharashtra	3	709·9 (348)	Nil	709·9 (348)	648·0 (378)	Nil	648·0 (378)	433·2 (276)	Nil	433·2 (276)
Punjab	12	217·5 (639)	24·1 (86)	241·6 (725)	253·8 (807)	28·0 (26)	281·8 (833)	538·5 (1,095)	5·5 (49)	544·0 (1,144)
Rajasthan	3	*Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
U.P.	15	71·9 (493)	16·3 (202)	88·2 (695)	60·3 (367)	23·3 (254)	83·6 (621)	52·3 (207)	58·3 (370)	110·6 (577)
All States	45	1,091·3 (1,620)	41·2 (293)	1,132·5 (1,913)	1,057·3 (1,681)	54·8 (316)	1,112·1 (1,997)	1,053·7 (1,637)	66·7 (437)	1,119·9 (2,074)
Average per Beneficiary ..		673·6	140·6	592·0	629·0	173·4	556·9	643·7	152·6	540·0

*No credit was distributed in Rajasthan in the selected villages as the Cooperative Societies were defaulters and could not procure funds from the Cooperative Bank for this purpose.

NOTE.—Figures given in brackets indicate the number of beneficiaries.

TABLE 2·11—*Percentage of participants and non-participants of wheat cultivators covered by cooperatives in the selected villages according to size of cultivation holding*

State					No of selected villages	Total cultivators growing the crop		Percentage reporting membership in cooperative among participant cultivators according to size group.						
						Ps	NPs	Below 2·50 acres	2·50 to 5·00 acres	5·00 to 10·00 acres	10·00 to 20·00 acres	20·00 to 50·00 acres	50·00 and above	All sizes
1					2	3	4	5	6	7	8	9	10	11
Bihar	..	..	..	..	3	95	66	10·00	38·10	27·27	23·53	00·00	00·00	22·11
Haryana	.	..	..	..	6	128	671	00·00	100·00	66·66	38·78	44·26	20·00	43·75
Punjab	..	..	..	..	12	896	223	70·00	77·50	74·63	79·87	82·68	60·00	78·79
Rajasthan		..	..	..	3	71	160	00·00	100·00	50·00	27·27	39·53	35·71	38·02
U.P.	..	..	...	..	18	739	1,020	71·19	70·51	78·80	70·30	83·33	100·00	74·02
All States		..	..	..	45	1,929	2,140	58·94	68·95	74·02	72·37	69·25	48·57	70·35

TABLE 2·11—(*Contd.*)

State					No. of selected villages	Total cultivators growing the crop		Percentage reporting membership in cooperative among Non-participant cultivators according to size group.						
						Ps	NPs	Below 2·50 acres	2·50 to 5·00 acres	5·00 to 10·00 acres	10·00 to 20·00 acres	20·00 to 50·00 acres	50·00 & above	All sizes
1					2	3	4	12	13	14	15	16	17	18
Bihar	..	..	..	..	3	95	66	00·00	00·00	00·00	00·00	00·00	00·00	00·00
Haryana	..	..	..	..	6	128	671	00·00	45·00	29·34	21·14	19·08	00·00	22·96
Punjab	...	..	..	..	12	896	223	57·14	50·00	71·15	83·54	66·67	00·00	73·09
Rajasthan		..	..	..	3	71	160	00·00	00·00	4·76	26·19	19·64	46·15	18·75
U.P.	...	..	..	..	18	739	1,020	30·98	43·66	42·86	50·94	56·25	66·67	40·39
All States		..	..	..	45	1,929	2,140	27·78	41·80	40·51	36·26	24·69	29·63	35·47

TABLE 2·12—*No. of selected participants for wheat and the amount of credit obtained from various sources during Rabi seasons of* 1966-67 *and* 1967-68.

(Amount in Rs.)

State	Agency	Rabi 1966-67				Rabi 1967-68				Percentage proportion of loan given in kind *i.e.*	
		H.Y. crop		Other crops		H.Y. crop		Other crops		Rabi 1966-67	Rabi 1967-68
		No.	Amount	No.	Amount	No.	Amount	No.	Amount		
1	2	3	4	5	6	7	8	9	10	11	12
Bihar ..	Deptt.	5	617	—	—	1	114	—	—	100·00	100·00
Haryana ..	Deptt.	—	—	11	3,785	17	2,595	12	1,474	100·00	100·00
	Coop.	—	—	4	4,300	—	—	—	—	Nil	—
	Total	—	—	15	8,085	17	2,595	12	1,474	41·21	100·00
Punjab ..	Block	—	—	—	—	2	200	—	—	—	100·00
	Deptt.	—	—	—	—	1	120	—	—	—	100·00
	Coop.	1	100	11	5,100	25	11,656	11	6,785	15·85	87·86
	Total	1	100	11	5,100	28	11,976	11	6,785	15·85	90·18
Rajasthan ..	Block	—	—	4	9,087	—	—	—	—	100·00	—
U.P. ..	Block	11	925	11	10,246	45	8,205	1	245	100·00	100·00
	Deptt	3	405	3	340	19	2,780	—	—	100·00	100·00
	Coop.	5	628	21	5,307	26	5,953	10	1,840	69·67	78·19
	Others	2	1,021	—	—	—	—	—	—	100·00	—
	Total	21	2,979	35	15,893	90	16,938	11	2,085	90·48	91·14
All States ..	Block	11	925	15	19,333	47	8,405	1	245	100·00	100·00
	Deptt.	8	1,022	14	4,125	38	5,609	12	1,474	100·00	100·00
	Coop.	6	728	36	14,707	51	17,609	21	8,625	28·82	85·26
	Others	2	1,021	—	—	—	—	—	—	100·00	—
	Total	27	3,696	65	38,165	136	31,623	34	10,344	71·86	91·46

TABLE 3·1—*Percentage of cultivators participating in the H.Y. wheat programme and the number of selected participants by size-group of operational holding*

State	Percentage proportion participating in each size-group						
	Below 2·5 acres	2·5-5·0 acres	5·0-10·0 acres	10·0-20·0 acres	20·0-50·0 acres	50·0 acres and above	All sizes
1	2	3	4	5	6	7	8
Bihar	42·25	67·74	62·86	89·47	100·00	100·00	59·01
Haryana	0·00	4·76	6·70	13·39	28·64	31·25	16·08
Punjab	58·82	68·97	66·34	85·12	92·27	100·00	80·07
Rahasthan	0·00	12·50	4·55	20·75	43·43	51·85	30·74
U.P.	25·40	36·79	41·89	65·58	75·00	62·50	42·01
All States	27·16	36·20	38·42	53·12	51·53	47·41	43·31

TABLE 3.1—(*Contd.*)

State	Number of participants selected in each size group						
	Below 2·5 acres	2·5-5·0 acres	5·0-10·0 acres	10·0-20·0 acres	20·0-50·0 acres	50·00 and above	All sizes
1	9	10	11	12	13	14	15
Bihar	10	6	7	6	2	1	32
Haryana	—	1	6	23	30	3	63
Punjab	—	5	28	57	25	1	116
Rajasthan	—	1	1	6	22	8	38
U.P.	31	38	59	48	15	1	192
All States	41 (9·3)	51 (11·6)	101 (22·9)	140 (31·7)	94 (21·3)	14 (3·2)	441 (100·0)

NOTE : Figures in brackets are percentages to total.

TABLE 3·2—*Distribution of Respondents by the agency approaching them for taking up the high yielding wheat varieties programme*

State	Distribution by agency approaching										
	VLW	Office bearers of Panchayat/ Cooperatives	Progressive cultivators	Other cultivators	None, but on seeing demonstrations	None but on hearing from radio or reading literature	AEO (Agr.)	BDO	DAO	Others	Total
1	2	3	4	5	6	7	8	9	10	11	12
Bihar	25	—	—	—	2	—	—	—	—	5	32
Haryana	15	3	5	14	5	4	9	—	1	7	63
Punjab	34	1	23	27	14	11	—	3	—	3	116
Rajasthan	16	1	1	7	—	1	3	—	1	8	38
U. P.	142	1	5	35	3	1	—	3	—	2	192
All States	232	6	34	83	24	17	12	6	2	25	441
	(52·61)	(1·36)	(7·71)	(18·83)	(5·44)	(3·85)	(2·72)	(1·36)	(0·45)	(5·67)	(100.00)

NOTE: Figures in the brackets are the percentages to total column.

TABLE 3·3—*Distribution of wheat respondents who have seen trials/demonstrations by the year of seeing and where seen*

State	Total no. reporting seeing	1964-65 or earlier Demonstrations seen in Fellow cultivators' fields			1965-66 Demonstrations seen in Fellow cultivators' fields.			1966-67 Demonstration seen in Fellow cultivators' fields.		
			Other places	Total		Other places	Total		Other places	Total
1	2	3	4	5	6	7	8	9	10	11
Bihar	20	—	—	—	—	—	—	17	2	19
Haryana	28	—	1	1	5	1	6	20	3	23
Punjab	53	—	—	—	—	1	1	54	5	59
Rajasthan	1	—	—	—	—	—	—	—	1	1
U. P.	64	2	1	3	1	2	3	52	53	105
All States	166	2	2	4	6	4	10	143	64	207

TABLE 3·3—*Contd.*

State	Total no. reporting seeing	1967-68 Demonstrations seen in Fellow cultivators' fields.			All years Demonstrations seen in Fellow cultivators' fields		
			Other places	Total		Other places	Total
1	2	12	13	14	15	16	17
Bihar	20	1	—	1	18	2	20
Haryana	28	—	1	1	25	6	31
Punjab	53	2	1	3	56	7	63
Rajasthan ...	1	—	—	—	—	1	1
U. P.	64	—	3	3	55	59	114
All States	166	3	5	8	154	75	229

TABLE 3·4—*Percentage of selected participants adopting the H.Y. Wheat varieties by year of adoption and their area under H.Y. Varieties during the year of adoption and the last two years*

(Area in acres)

Date/Size Group	1965-66 or earlier adoption				1966-67 as year of adoption		
	Percentage adopting	Area in years of adoption	Area for 1966-67	Area for 1967-68	Percent adopting	Area in year of adoption	Area for 1967-68
1	2	3	4	5	6	7	8
Bihar	—	—	—	—	68·8(22)	16·51	19·34
Haryana	—	—	—	—	34·9(22)	82·05	146·84
Punjab	0·9(1)	6·0	—	1·00	25·0(29)	41·40	223·20
Rajasthan ..	—	—	—	—	50·0(19)	71·24	105·16
U. P.	2·8(5)	5·70	23·70	41·42	35·7(65)	61·87	137·53
All States	1·4(6)	11·70	23·70	42·42	36·4(157)	273·07	632·07
Below 2·5 Acs. ..	—	—	—	—	42·9(15)	6·57	8·98
2·50—5·0 ,, ..	—	—	—	—	36·7(18)	15·14	22·18
5·0—10·0 ,, ..	2·0(2)	0·70	3·60	7·55	33·0(33)	34·19	63·93
10·0—20·0 ,, ..	1·5(2)	7·00	0·00	1·67	30·2(42)	48·19	149·04
20·0—50·0 ,, ..	1·1(1)	1·00	9·00	15·20	41·5(39)	108·37	268·43
50·0 & above ..	7·1(1)	3·00	11·00	18·00	71·4(10)	60·61	119·51

NOTE:— Figures in the brackets are the actual numbers of participants.

TABLE 3.4—*Contd.*

State/Size group	1967-68 as year of adoption		For all years of adoption		
	Per cent adopting	Area in year of adoption.	Total adopting	Area in year of adoption	Area during 1967-68
1	9	10	11	12	13
Bihar	31 ·2(10)	4 ·63	32	21 ·14	23 ·97
Haryana	65 ·1(41)	134 ·98	63	217 ·03	281 ·82
Punjab	74 ·1(86)	372 ·01	116	419 ·41	596 ·21
Rajasthan	50 ·0(19)	63 ·02	38	134 ·26	168 ·18
U. P.	61 ·5(112)	171 ·94	182	239 ·51	350 ·89
All States	62 ·2(268)	746 ·58	431	1,031 ·35	1,421 ·07
Below 2 ·5 Acres	57 ·1(20)	10 ·49	35	17 ·06	19 ·47
2 ·50—5 ·00 ,,	63 ·3(31)	36 ·63	49	51 ·77	58 ·81
5 ·0—10 ·0 ,,	65 ·0(65)	111 ·57	100	146 ·46	183 ·05
10 ·0—20 ·0 ,,	68 ·3(95)	319 ·30	139	374 ·49	470 ·01
20 ·0—50 ·0	57 ·4(54)	256 ·47	94	365 ·84	540 ·10
50 ·0 & above	21 ·5(3)	12 ·12	14	75 ·73	149 ·63

NOTE:—Figures in the brackets are the actual numbers of participants.

TABLE 3·5—*Average cultivation holding and areas under H.Y. Wheat and other improved varieties*

State/Size group	Rabi 1966-67			Rabi 1967-68		
	Gross cropped area	Area under H. Y. V.	Area under other improved varieties	Gross cropped area	Area under H.Y.V.	Area under other improved varieties
1	2	3	4	5	6	7
Bihar	1·82	0·52	0·71	1·78	0·75	0·67
Haryana	5·78	1·24	4·49	8·06	4·21	3·85
Punjab	7·73	0·35	7·38	9·00	5·05	3·95
Rajasthan	10·17	1·99	7·03	9·11	4·31	4·01
U. P.	2·76	0·43	1·85	3·24	1·70	1·21
All States	5·03	0·67	4·00	5·81	3·07	2·49
Below 2·5 Acres	0·68	0·16	0·29	0·77	0·46	0·19
2·5—5·0 „	1·71	0·30	1·14	1·67	1·13	0·42
5·0—10·0 „	2·83	0·38	2·14	3·22	1·73	1·23
10·0—20·0 „	5·05	0·34	4·41	6·08	3·14	2·75
20·0—50·0 „	9·06	1·19	7·39	10·69	5·46	4·86
50·0 & above	18·26	5·56	11·59	18·43	10·69	7·03

Table 3·6—*Distribution of plots of H.Y. Wheat by the extent of ploughing and adoption of other improved practices*

State/Size group	Total no. of plots	Distribution of plots according to equipment used and no. of ploughing & depth						
		Tractor	Iron plough			Desi plough		
			Less than 4 times	4-6 times	More than 6 times	Less than 4 times	4-6 times	More than 6 times
1	2	3	4	5	6	7	8	9
Bihar	72	—	—	—	—	5	59	8
Haryana	150	22	6	3	1	21	46	51
Punjab	298	38	50	74	96	15	13	12
Rajasthan	64	2	—	18	38	5	1	—
U.P.	500	12	5	58	57	41	143	184
All States	1084	74	61	153	192	87	262	255
		(6·83)	(5·63)	(14·11)	(17·71)	(8·03)	(24·17)	(23·52)
Below 2·5 acres	60	—	—	1	1	6	15	37
2·5—5·0 „	109	2	1	6	6	6	41	47
5·0—10·0 „	225	5	12	34	37	16	65	56
10·0—20·0 „	357	12	31	70	63	32	84	65
20·0—50·0 „	279	50	17	30	72	24	51	35
50·0 acres & above	54	5	—	12	13	3	6	15

Note:—Figures in the brackets are percentages to total plots.

TABLE 3·6—(*Contd.*)

State/Size group	Total No. of plots.	Distribution of plots according to equipment used and no. of ploughings & depth					
		Depth of Ploughing			Plots reporting		
		Less than 4″	4-6″	Above 6″	Use of roller or plan	Applying basal pesticides	Green manuring
1	2	10	11	12	13	14	15
Bihar	72	—	72	—	72	1	—
Haryana	150	13	95	42	152	22	12
Punjab	298	—	298	—	298	7	—
Rajasthan	64	—	57	7	63	51	—
U. P.	500	25	263	212	498	90	27
All States	1,084	38	785	261	1,081	171	40
		(3·51)	(72·42)	(24·08)	(99·72)	(15·77)	(3·69)
Below 2·5 acres	60	—	41	19	59	5	—
2·5—5·0 ,,	109	6	69	34	109	16	2
5·0—10·0 ,,	225	20	141	64	224	32	6
10·0—20·0 ,,	357	7	293	57	357	29	17
20·0—50·0 ,,	279	2	205	72	278	63	11
50·0 acres & above	54	3	36	15	54	26	4

NOTE:—Figures in the brackets are percentages to total plots.

TABLE 3·7—*Distribution of plots of HY Wheat according to basal doses of fertilisers*

(Qnty. in Kg. per acre)

State/Size Group	Total No. of plots	Plots where no fertilisers were used	Distribution of plots according to basal doses of fertilisers.									
			'N' in terms of A.S.					'P' in terms of Super				
			Below 70	70-99	100-149	150 & above	Average dose per acre	Below 70	70-99	100-149	150 & above	Average dose per acre
1	2	3	4	5	6	7	8	9	10	11	12	13
Bihar	72	2	68	2	—	—	46·9	13	12	2	—	68.8
Haryana	150	47	44	6	14	6	66·2	20	5	12	10	65·2
Punjab	298	18	125	36	84	20	75·9	46	13	9	90	116·5
Rajasthan	64	23	17	13	2	1	61·4	2	10	6	8	140·1
U. P.	500	72	156	90	88	25	80·5	55	89	90	81	127·0
All States	1084	162 (14·94)	410 (37·82)	147 (13·56)	188 (17·34)	52 (4·80)	73·6 —	136 (12·55)	129 (11·90)	119 (10·98)	189 (17·44)	114·7 —
Below 2·5 acres	60	10	15	18	8	4	86·5	3	15	5	9	124·7
2·5—5·0 acres	109	13	49	22	8	6	72·0	16	19	9	6	92·3
5·0—10·0 acres	225	25	104	28	40	8	68·8	23	32	32	45	124·2
10·0—20·0 acres	357	59	123	36	59	15	77·9	57	25	36	56	104·5
20·0—50·0 acres	279	45	107	28	58	14	12·8	33	34	33	58	114·2
50·0 acres & above	54	10	12	5	15	5	69·9	4	4	4	15	142·6

NOTE :—Figures in the brackets are percentages to total plots.

TABLE 3·7—(*Contd.*)

State/Size-Group	Distribution of plots according to basal doses of fertilisers											
	K in terms of muriate of Potash					Mixtures grades						
	Below 20	20-29	30-39	40 & above	Average dose	No using exclusively	Total No. using	Below 70	70-99	100-149	150 & above	Average dose
1	14	15	16	17	18	19	20	21	22	23	24	25
Bihar	—	—	—	—	—	—	—	—	—	—	—	—
Haryana	2	—	1	4	5·7	—	—	—	—	—	—	—
Punjab	21	17	7	7	30·3	—	1	1	—	—	—	55·0
Rajasthan	1	4	—	—	29·9	—	—	—	—	—	—	—
U. P.	127	70	26	11	31·6	25	25	6	5	4	10	112·9
All States	151	91	34	18	29·9	25	26	7	5	4	10	112·0
	(13·93)	(8·39)	(3·14)	(1·66)		(2·31)	(2·40)	(0·65)	(0·46)	(0·37)	(0·92)	
Below 2·5 acres	12	7	1	2	31·8	—	—	—	—	—	—	—
2·5—5·0 acres	24	13	—	—	23·1	—	1	1	—	—	—	55·0
5·0—10·0 acres	44	22	4	3	27·6	4	4	—	2	2	—	111·7
10·0—20·0 acres	35	15	8	8	31·3	14	14	4	3	1	6	105·8
20·0—50·0 acres	34	30	11	3	31·1	7	7	2	—	1	4	120·7
50·0 & above	2	4	10	2	30·5	—	—	—	—	—	—	—

TABLE 3·8—*Percentage distribution of sowings of H.Y. Wheat by seed rate, method of sowing, etc.*

State/Size group	Reported seed rate (ranges)			Reported depth of sowings of upto				Reported distance between rows		
	Below recommended	Recommended	Above recommended	1″	2-3″	above 3″	Avg. depth in inches	8″ or less	9″	10″ or more
1	2	3	4	5	6	7	8	9	10	11
Bihar	6·25	93·75	—	—	90·32	9·68	2·97	84·38	15·62	—
Haryana	12·63	84·21	3·16	3·16	96·84	—	2·08	68·09	31·91	—
Punjab	53·00	47·00	—	1·26	98·74	—	2·09	62·00	38·00	—
Rajasthan	38·46	61·54	—	—	92·31	7·69	2·90	100·00	—	—
U.P.	17·43	77·99	4·58	—	93·03	6·97	2·48	38·95	61·05	—
All States	26·25	70·89	2·86	0·63	94·47	4·90	2·40	53·29	46·71	—
Below 2·5 acres	30·35	67·86	1·79	—	91·37	8·63	2·58	48·21	51·79	—
2·5—5·0 ,,	29·55	68·18	2·27	—	89·53	10·47	2·45	45·45	54·55	—
5·0—10·0 ,,	19·89	75·81	4·30	0·57	92·57	6·86	2·44	51·07	48·93	—
10·0—20·0 ,,	21·45	76·00	2·55	1·55	95·75	2·70	2·28	49·45	50·55	—
20·0—50·0 ,,	35·42	61·46	3·12	—	97·25	2·75	2·44	64·06	35·94	—
50·0 & above	34·21	65·79	—	—	92·11	7·89	2·58	63·16	36·84	—

TABLE 3·9—*Percentage distribution of HY Wheat plots by inter-culture operations, etc.*

State/Size group	Percent of plots reporting			Percent of plots where hoeing reported up to.		Percent of plots reporting inter-culture operations during		Percent of plots reporting.	
	Hand weeding	Use of push how	Other equipment	2″ deep	More than 2″ deep	15-30 days after sowing	31 days or more after sowing	Top dressing with fertilisers	Avg. dose (in Kg.) per acre
1	2	3	4	5	6	7	8	9	10
Bhar	13·89	4·17	33·33	36·11	—	33·33	9·72	48·61	56·57
Haryana	64·00	—	8·67	66·67	—	42·00	30·67	66·00	75·57
Punjab	98·00	—	—	97·65	—	51·68	46·31	89·93	104·48
Rajasthan	—	62·50	28·13	67·19	—	59·38	29·69	85·94	103·38
U. P.	33·60	2·00	54·00	18·80	12·60	54·80	34·80	83·60	72·07
All States	52·21	4·89	29·98	51·11	5·81	51·01	35·42	80·72	91·41
Below 2·5 acres	8·33	—	81·67	36·67	25·00	80·00	10·00	86·67	61·02
2·5—5·0 ,,	18·35	—	58·72	29·36	12·84	62·29	24·77	73·40	69·99
5·0—10·0	51·11	1·33	40·00	38·22	8·44	52·45	35·55	77·36	92·35
10·0—20·0 ,,	74·51	3·64	11·20	55·18	4·20	46·78	42·58	81·23	89·76
20·0—50·0	54·48	9·32	25·09	67·38	—	46·69	40·14	85·31	96·02
50·0 & above	14·82	20·37	40·74	53·71	—	61·11	12·96	75·93	89·93

TABLE 3·10—*Distributian of respondents for Wheat adopting various preventive curative P. P. measures.*

State	Total participants	Percent of participants taking					Curative P. P. measures				
		Soil treatment	Seed treatment	Using chemicals in standing water	Spraying & dusting	Poison baiting	Participants reporting pests and diseases	Participants adopting curative measures	No. of cases where treatment		
									Effective	Partially effective	Not effective
1	2	3	4	5	6	7	8	9	10	11	12
Bihar	32	—	—	1	—	—	1	—	—	—	—
Haryana	63	—	—	—	—	—	2	2	1	1	—
Punjab	116	1	—	—	7	—	39	27	23	23	3
Rajasthan	38	—	—	—	—	7	1	1	—	—	1
U.P.	192	4	54	—	1	2	15	4	2	1	1
All States	441	5	54	1	8	9	58	34	26	25	5
		(1·13)	(12·24)	(0·23)	(1·81)	(2·04)	(13·15)	(58·62)	(46·43)	(44·64)	(8·93)

NOTE :—Figures in the brackets are percentages to total participants.

TABLE 3·11—*Distribution of irrigation sources owned by selected wheat participants and by the period of acquisition*

State	Tube-wells			Wells with Motors and oil engines			P.C. acquired in			Others			All sources		
	Total	P. C. acquired in		Total	P. C. acquired in		Total	Other well		Total	P.C. acquired in		Total	P.C. acquired in	
		1966-67	1967-68		1966-67	1967-68		1966-67	1967-68		1966-67	1967-68		1966-67	1967-68
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Bihar ..	—	—	—	4	50·00	50·00	10	10·00	—	—	—	—	14	21·43	14·29
Haryana ..	25	16·00	8·00	—	—	—	64	—	—	—	—	—	89	4·50	2·25
Punjab ..	58	20·69	25·86	3	—	—	79	1·27		—	—	—	140	9·29	10·71
U. P. ..	38	28·95	28·95	—	—	—	21	4·76	4·76	51	5·88	5·88	110	13·64	13·64
All States..	121	22·31	23·14	7	28·57	28·57	174	1·72	0·57	51	5·88	5·88	353	9·92	9·63

Table 3·12—*Percentage distribution of plots of HY Wheat by sources of irrigation*

State	Source and extent of irrigation reported													
	Canals		Tube-wells		Wells with pumpsets		Other wells.		Tanks		Other sources		All sources	
	P.C. reporting	P.C. reporting sufficient irrigation	P.C. reporting	P.C. reporting sufficient irrigation	P.C. reporting	P.C. reporting sufficient irrigation	P.C. reporting	P.C. reporting sufficient irrigation	P.C. reporting	P.C. reporting sufficient irrigation	P.C. reporting	P.C. reporting sufficient irrigation	P.C. reporting	P.C. reporting sufficient irrigation
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Bihar	94·37	94·37	—	—	5·63	5·63	—	—	—	—	—	—	100·00	100·00
Haryana	30·62	30·62	45·00	45·00	—	—	—	—	—	—	24·38	21·25	100·00	96·87
Punjab	16·39	13·33	58·60	54·45	1·12	0·56	23·89	21·67	—	—	—	—	100·00	90·00
Rajasthan ..	100·00	61·90	—	—	—	—	—	—	—	—	—	—	100·00	61·90
U.P.	27·78	24·33	47·89	45·79	0·38	0·38	2·30	2·30	3·07	2·11	18·58	17·81	100·00	92·72
All States.. ..	32·57	28·06	45·31	43·11	0·85	0·68	8·33	7·59	1·37	0·94	11·57	10·80	100·00	91·18

Table 4.1—*Average cash expenditure (in Rupees) on in-puts per acre for high yielding (Wheat) and non-high yielding holding of the participants.*

State/Size group	Seeds		Fertilisers		Plant Protection		Labour charges		Irrigation charges		Other expenses		Total expenses	
	H.Y. holding	Other holding	H.Y. holding	Other holding	H.Y. holding	Other holding	H.Y. holding	Other holding	H.Y. holding	Other holding	H. Y. holding	Other holding	H. Y. holding	Other holding
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Bihar	17·93	4·72	57·90	5·05	0·20	—	88·44	11·35	18·48	6·90	0·37	0·14	183·35	28·18
Haryana	26·33	1·38	67·30	2·74	0·80	—	29·72	3·95	21·73	5·49	22·65	1·23	167·83	14·81
Punjab	28·34	1·28	105·75	13·18	0·74	—	69·64	13·41	26·78	6·05	33·52	3·65	264·81	37·58
Rajasthan ..	19·71	1·20	92·97	14·56	7·58	0·55	157·97	40·96	6·68	2·79	6·31	1·69	291·25	61·77
U.P.	34·71	2·52	93·49	6·79	0·60	0·03	89·87	16·54	28·51	4·35	8·06	1·55	255·28	31·81
All States.. ..	28·32 (11·56)	1·89 (5·48)	92·78 (37·87)	8·85 (25·67)	1·37 (0·56)	0·09 (0·26)	77·49 (31·63)	16·64 (48·27)	23·69 (9·67)	4·99 (14·48)	21·30 (8·69)	1·99 (5·77)	244·98	34·47
Size group :														
Less than 2·5 acres	39·80	5·86	82·79	11·54	0·82	—	34·56	4·45	37·08	6·48	6·93	0·31	202·00	28·66
2·5—5·0 acres	32·71	3·04	66·74	7·08	0·49	—	65·99	7·42	32·63	5·52	16·83	1·35	215·40	24·43
5·0—10·0 ,,	29·92	3·29	83·21	9·42	0·68	0·03	72·97	13·47	21·20	4·85	19·37	2·29	227·39	33.37
10·0—20·0 ,,	28·51	1·89	82·65	7·43	0·33	0·02	61·93	13·32	22·87	4·47	19·61	1·74	215·94	28·81
20·0—50·0	31·32	1·18	102·85	9·44	1·78	0. 06	81·54	18·07	25·37	5·39	28·11	2·55	270·99	36·72
50·0 and above	11·70	2·05	111·48	10·33	4·45	0·46	127·39	26·88	17·99	4·88	7·99	0·89	281·03	45·51

NOTE :—Figures in the brackets are percentages to total expenditure.

TABLE 4·2 :—*Distribution of harvests by per acre yields (in quintals) for the selected participants for H. Y. wheat*

State/Size group	Per acre yield in quintals				
	Less than 10 quintals	10-20 quintals	20-30 quintals	30-40 quintals	Average yield in quintal.
1	2	3	4	5	6
Bihar	26	6	—	—	6·71
Haryana	44	43	4	2	11·50
Punjab	72	109	5	—	11·16
Rajasthan	14	36	1	—	11·92
U.P.	176	149	10	2	9·13
Size—Group					
Less than 2·5 acres	29	25	—	—	9·57
2·5—5·0 acres	42	35	—	—	9·22
5·00—10·0 ,, ...	79	70	3	2	9·68
10·0—20·0 ,, ...	111	93	5	—	10·01
20·0—50·0 ,, ...	62	100	9	1	11·42
50·00 and above	9	20	3	1	12·59
All States	332(47·50)	343(49·07)	20(2·86)	4(0·57)	10·75 (26·56)

NOTE :—Figures in the brackets are percentages to total harvests.

TABLE 4·3—*Distribution of participants growing high yielding and other local varieties of wheat according to the levels of yields*

State	Yield (in Quintals) of local varieties per acre	Yield (in Quintals) of high yielding varieties per acre					
		Below 5	5 to 10	10 to 15	15 to 20	20 or more	Total
1	2	3	4	5	6	7	8
Haryana	Less than 5	—	1	—	1	—	2
	5 to 10	2	17	17	4	—	40
	10 to 15	—	—	2	—	—	2
	TOTAL	2	18	19	5	—	44
Punjab	Less than 5	1	15	9	6	—	26
	5 to 10	—	19	51	1	—	76
	10 to 15	—	—	2	—	—	2
	TOTAL	1	34	62	7	—	104
U. P.	Less than 5	9	15	8	1	—	33
	5 to 10	6	30	39	4	2	81
	10 to 15	—	2	4	4	—	10
	TOTAL	15	47	51	9	2	124
All States	Less than 5	10	31	17	3	—	61
	5 to 10	8	66	107	14	2	197
	10 to 15	—	2	8	4	—	14
	TOTAL	18	99	132	21	2	272

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TABLE 4·4—*Distribution of harvesting cases by average yield per acre and according to various losses reported—Variety-wise for H. Y. Wheat*

State	Variety	Total harvests	Average yield per acre (in Quintals)	Various losses reported due to reasons							
				Lodging		Shedding		Pests/Diseases		Delayed harvests	
				No. of plots	Percent losses	No. of plots	Percent losses	No. of plots	Percent losses	No. of plots	Percent losses
1	2	3	4	5	6	7	8	9	10	11	12
Bihar	Lerma Rojo	32	6·71	—	—	1	10·00	1	5·00	—	—
Haryana	Lerma Rojo	11	11·55	—	—	—	—	—	—	—	—
	Sonara Varieties	12	11·20	—	—	2	9·00	—	—	—	—
	Kalyan S. 227	11	19·15	—	—	2	4·61	—	—	—	—
	P. V. 18	11	18·45	5	7·68	—	—	—	—	—	—
	Others	47	9·45	13	10·34	2	5·08	1	8·00	—	—
	TOTAL	92	11·50	18	10·01	6	6·49	1	8·00	—	—
Punjab	Lerma Rojo	102	10·71	29	7·10	4	6·64	43	4·81	—	—
	Sonara Varieties	20	9·84	2	12·66	—	—	7	5·42	—	—
	Kalyan S. 227	14	11·27	5	1·95	3	1·00	5	3·66	—	—
	P. V. 18	46	15·58	9	2·52	4	1·77	13	3·75	—	—
	Others	4	5·34	2	45·00	1	1·00	2	2·04	—	—
	TOTAL	186	11·16	47	8·04	12	5·20	70	4·70	—	—

TABLE 4·4—(*Contd.*)

1	2	3	4	5	6	7	8	9	10	11	12
Rajasthan	Lerma Rojo	22	12·84	8	16·78	—	—	4	5·13	—	—
	Sonara Varieties ..	9	9·45	1	13·00	1	12·00	3	28·16	—	—
	Kalyan S. 227	1	12·90	1	20·00	—	—	—	—	—	—
	P. V. 18	5	11·29	2	19·18	—	—	—	—	—	—
	Others	14	12·04	10	17·18	—	—	—	—	—	—
	TOTAL	51	11·92	22	16·95	1	12·00	7	14·44	—	—
U. P.	Lerma Rojo	134	9·82	11	21·35	14	8·13	15	13·73	7	8·86
	Sonara Varieties	73	9·57	3	3·92	27	6·53	15	10·44	8	13·23
	Kalayan S. 227	8	18·97	1	2·00	—	—	2	1·44	1	10·00
	K. 68	113	7·78	17	16·05	9	8·56	21	20·38	3	4·50
	P. V. 18	3	15·34	—	—	2	1·00	—	—	—	
	Others	7	13·06	1	2·00	—	—	—	—	3	8·82
	TOTAL	338	9·15	33	15·55	52	7·28	53	16·70	22	8·74
ALL STATES	Lerma Rojo	301	10·66	48	9·95	19	7·40	63	5·70	7	8·86
	Sonara Varieties	114	9·90	6	7·76	30	7·35	25	13·20	8	13·20
	Kalyan S. 227	34	14·35	7	2·68	5	2·86	7	2·42	1	2·42
	K. 68	113	7·78	17	16·05	9	8·56	21	20·38	3	20·38
	P. V. 18	65	16·43	16	3·58	6	1·65	13	3·75	—	
	Others	72	10·17	26	16·30	3	4·70	3	5·43	3	5·43
	All Varieties	699	10·75	120	11·10	72	6·65	132	8·30	22	8·74

TABLE 5·1—*Percentage distribution of participant cultivators' views regarding the performance of H.Y. Wheat*

Sl. No.	Item of Performances	Percent reporting for various varieties						
		Lerma Rojo	Sonara 64	Kalyan S. 227	K. 68	P. V. 18	Others	All Varieties
1	2	3	4	5	6	7	8	9
1.	Higher yield	40·7	34·9	46·1	22·4	52·8	39·2	38·19
2.	No appreciable increase in yield	5·1	12·8	0·0	19·2	1·8	2·4	7·69
3.	Coarse grain/Poorer in taste	6·7	6·9	0·0	31·6	7·5	0·0	5·02
4.	Poor cooking quality	1·4	1·4	3·1	0·5	3·7	1·6	1·62
5.	Low market price	4·9	9·8	0·0	1·6	2·8	0·0	4·29
6.	Cultivation more expensive	3·6	6·4	1·5	13·9	0·0	0·0	4·85
7.	Cultivation less expensive	1·6	0·4	4·6	0·5	1·8	0·0	1·29
8.	No difference in the cost of production	1·0	0·0	4·6	0·0	0·0	0·0	0·73
9.	More susceptible to pests and diseases	0·3	0·4	0·0	5·8	0·0	0·0	1·13
10.	Less susceptible to pests and diseases	5·4	0·9	4·6	1·6	2·8	6·4	3·96
11.	Does not lodge	9·6	8·6	7·6	2·6	8·4	4·0	7·69
12.	Unsuitability to soil, irrigation etc.	0·3	0·4	0·0	1·6	0·0	0·8	0·57
13.	Short duration beneficial	3·3	5·4	4·6	6·9	0·0	1·6	3·80
14.	Straw yield higher	2·5	0·0	1·5	5·3	0·0	9·6	2·99
15.	Less or same straw yield	1·8	2·9	1·5	2·6	0·0	0·8	1·78
16.	Straw is not liked by cattle	2·0	0·4	1·5	0·0	0·9	1·6	1·29
17.	Others	9·2	7·3	18·4	1·3	16·9	3·2	13·11
18.	TOTAL	100·0	100·0	100·0	100·0	100·0	100·0	100·0

Table 5·2—*Distribution of selected participant cultivators for H. Y. Wheat according to problems reported on various aspects of H.V.P.*

State	Total participants	No. of participants according to problems reported													
		Seed inadequate and not easily available	Fertiliser supply		P. P. materials not easily available	Spare parts of Agri. Implements not easily available	Non-availability of compost	Shortage of water in irrigation sources	Poor germination	Early flowering	Attack of pests/diseases	Credit problems	Labour shortage	Marketing problems	Others
			Not timely	Inadequate											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Bihar	32	5	14	19	—	—	—	5	1	—	3	12	—	11	—
Haryana	63	35	2	2	1	—	—	11	1	5	8	2	26	11	8
Punjab	116	36	30	23	—	—	9	20	9	8	18	40	50	4	—
Rajasthan	38	1	—	1	—	—	—	20	7	2	7	—	—	3	7
U.P.	192	12	33	35	4	9	7	33	16	47	46	35	142	192	6
ALL STATES	441	78	79	80	5	9	16	89	34	62	82	89	218	221	21
		(17·69)	(17·91)	(18·14)	(1·13)	(2·04)	(3·63)	(20·18)	(7·71)	(14·06)	(18·59)	(20·18)	(49·43)	(50·11)	(4·76)

Note : Figures in brackets are percentages to total participants.

TABLE 5·3—*Distribution of participant cultivators willing to continue the H.Y. Wheat varieties according to reasons*

State	Total no. of participants	Total no. willing to continue	Distribution of participant cultivators willing to continue by reasons								
			Higher yield	Non-lodging	Less susceptible to pests/diseases	With stands drought better	Better suited to soil & irrigation	Convenient duration for cropping pattern	Fine grain variety	More straw yield	Other reasons
1	2	3	4	5	6	7	8	9	10	11	12
Bihar	32	31 (96·88)	18	8	17	—	—	15	—	—	2
Haryana	63	61 (96·83)	49	21	11	5	1	—	15	4	12
Punjab	116	115 (99·14)	115	31	8	1	1	5	—	3	8
Rajasthan	38	27 (71·05)	27	—	1	—	—	—	—	—	—
U.P.	192	159 (82·81)	127	26	23	2	1	45	19	8	24
ALL STATES	441	393	336	86	60	8	3	65	34	15	46
		(89·12)	(76·19)	(19·50)	(13·61)	(1·81)	(0·68)	(14·74)	(7·71)	(3·40)	(10·43)

Note : **Figures in the** brackets are percentages to total participants.

TABLE 5·4—*Distribution of Non-participant wheat cultivators—size-group-wise*

State	Below 2·50 acres	2·50 acres to 5·0 acres	5·0 acres to 10·0 acres	10·0 acres to 20·0 acres	20·0 acres to 50·0 acres	50·0 acres and above	TOTAL
1	2	3	4	5	6	7	8
Bihar	10	3	4	—	—	—	17
Haryana	—	—	8	15	7	—	3[illegible]
Maharashtra	—	3	5	4	3	—	15
Punjab	5	5	14	12	3	—	
Rajasthan	—	—	2	5	4	3	14
U.P.	33	20	17	7	—	—	77
ALL STATES	48 (25·00)	31 (16·15)	50 (26·04)	43 (22·40)	17 (8·85)	3 (1·56)	192 (100·00)

Note : Percentages in brackets are to total respondents.

TABLE 5·5—*Distribution of Non-participant wheat cultivators by sources through which they have come to know of H.Y.V.P.*

State	Total No. of respondents	No. reporting knowledge of H.Y.V.P.	No. reporting sources through which known					Year in which trials & demonstration seen		
			Block	Radio/News paper	Trials & demonstrations	Coop.	Progressive cultivator	Prior to 1965-66	1966-67	1967-68
1	2	3	4	5	6	7	8	9	10	11
Bihar	17	17	3	11	3	—	—	—	6	1
Haryana	30	27	2	23	—	2	—	—	9	—
Maharashtra	15	—	—	—	—	—	—	—	—	—
Punjab	39	38	5	24	1	—	10	—	8	—
Rajasthan	14	14	2	5	—	2	6	—	—	—
U.P.	77	77	36	41	—	—	7	—	16	1
ALL STATES	192	173	48	104	4	4	23	—	39	2

TABLE 5.6—*Distribution of Non-participants for H.Y. Wheat according to views on performance of high yielding varieties of wheat*

State	Total respondents	No. reporting views on											
		Yield		Qty. of grain		Pests/diseasees		Duration		Other aspects			Lack of knowledge
		High	No. appreciable increase	Coarse/ poor in taste	Poor cooking quality	More susceptible	Moderately susceptible	Short duration	Longer duration	Good germination	No lodging	No shedding	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bihar	17	15	—	—	2	—	—	6	—	—	—	—	—
Haryana	30	22	1	9	2	—	—	6	—	—	—	1	—
Maharashtra	15	—	—	—	—	—	—	—	—	—	—	—	15
Punjab	39	36	2	32	1	3	24	24	2	19	21	19	—
Rajasthan	14	8	6	13	—	—	—	5	—	—	2	2	—
U. P.	77	65	7	48	12	1	61	63	2	33	39	37	—
ALL STATES	192	147	16	102	17	4	85	104	4	52	62	59	15

TABLE 5·7—*Distribution of Non-participants for the H.Y. wheat by reasons for non-adoption*

State	Total respondents	Reasons for Non-adoption									
		Cost of inputs higher	Involves more labour	Lack of irrigation	Seed not available in time	Non-availability of short term loan	Small holding/ being a tenant	Preference for desi variety	Loss of fodder	Low market price	Lack of knowledge
1	2	3	4	5	6	7	8	9	10	11	12
Bihar	17	—	1	—	3	14	4	1	—	—	—
Haryana	30	1	4	14	5	—	2	2	2	3	—
Maharashtra ..	15	—	—	—	—	—	—	—	—	—	15
Punjab	39	2	6	8	16	5	4	8	—	—	—
Rajasthan	14	—	—	4	—	—	1	7	3	1	—
U.P.	77	22	11	32	6	8	6	7	1	6	—
ALL STATES	192	25	22	58	30	27	17	25	6	10	15

TABLE 5·8—*Distribution of non-participants for H.Y. wheat by reasons for not taking up the programme during the next season*

State	Total respondents	No. reporting willing to take up HYV cultivation next season	No. of respondents (Not willing to take up H.Y.V.) by reasons						
			Cost of inputs higher	Lack of irrigation	Not ready to take risk in initial years	Small holding/ being a tenant	Lower market price	Preference for desi variety	Loss of fodder
1	2	3	4	5	6	7	8	9	10
Bihar	17	7	4	—	—	7	1	2	—
Haryana	30	20	—	2	2	—	1	1	—
Maharashtra	15	10	—	—	5	—	—	—	—
Punjab	39	28	4	2	—	3	1	5	—
Rajasthan	14	8	—	2	—	1	—	—	—
U.P.	77	46	13	11	1	—	2	12	3
ALL STATES	192	119	21	17	8	11	5	20	3

TABLE 6·1—*Supply of H. Y. Seed in selected villages and the sources of supply*

Crop	State	Rabi 1966-67						Rabi 1967-68					
		Quantity of seed distributed in quintals	P. C. of villages reporting timely supply	P. C. of supplies made by				Quantity of seed distributed in quintals	P.C. of villages reporting timely supply	P. C. of supplies made by			
				Block/ Dept.	Coop./ Panchayat	Culti-vators	Other agencies			Block/ Dept.	Coop./ Panchayat	Cultivators	Other agencies
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Paddy—	A. Pradesh	219·5	87·5	7·2	—	40·9	51·9	93·3	100·0	64·7	—	15·3	20·0
	Kerala	28·2	83·3	96·5	—	3·5	—	4·1	100·0	90·2	—	9·8	—
	Madras	6·0	100·0	100·0	—	—	—	112·3	100·0	1·2	—	98·8	—
	Mysore	151·0	100·0	—	—	100·0	—	103·8	100·0	—	—	100·0	—
	Orissa	1·0	33·3	100·0	—	—	—	20·3	100·0	100·0	—	—	—
	W. Bengal	1·0	16.7	100·0	—	—	—	5·6	100·0	46·4	—	—	53·6
	ALL STATES	406·7	69·0	12·5	—	59·5	28·0	339·4	100·0	26·0	—	67·6	6·4
Jowar—	Maharashtra	1·2	50·0	100·0	—	—	—	21·9	100·0	74·6	—	—	25·4
	Mysore	0·6	66·7	—	100·0	—	—	12·9	100·0	—	100·0	—	—
	ALL STATES	1·8	55·6	66·7	33·3	—	—	24·3	100·0	35·0	65·0	—	—

TABLE 6·2—*Distribution of selected respondents by the source of supply of seed and their mode of supply*

Crop	State	Total No. of sowings reported	Distribution of respondents by sources and their mode																	
			Block/Dept.						Village Institutions (Coop. and Panchayat)						Cultivators					
			Total	Cash	Credit	Exchange	% reporting		Total	Cash	Credit	Exchange	% reporting		Total	Cash	Credit	Exchange	% reporting	
							Timely supply	Treated seed					Timely supply	Treated seed					Timely supply	Treated seed
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Paddy	A. Pradesh	47	23	23	—	—	100·0	91·30	3	3	—	—	100·0	66·67	21	19	—	1	100·0	19·05
	Kerala	23	18	18	—	—	94·44	100·0	—	—	—	—	—	—	5	4	—	1	100·0	20·00
	Madras	17	1	1	—	—	—	—	—	—	—	—	—	—	16	7	—	9	100·0	—
	Mysore	9	—	—	—	—	—	—	—	—	—	—	—	—	9	4	—	5	100·0	25·00
	Orissa	27	9	9	—	—	66·67	11·11	—	—	—	—	—	—	18	15	—	2	100·0	—
	W. Bengal	56	28	28	—	—	96·43	92·86	—	—	—	—	—	—	28	9	—	19	100·0	64·29
	ALL STATES	179	79	79	—	—	92·41	83·54	3	3	—	—	100·0	66·67	97	58	—	37	100·0	25·77
Jowar	Maharashtra	56	56	51	1	—	100·0	100·0	—	—	—	—	—	—	—	—	—	—	—	—
	Mysore	30	5	5	—	—	100·0	100·0	16	3	13	—	100·0	100·0	9	5	4	—	100·0	100·0
	ALL STATES	86	61	56	1	—	100·0	100·0	16	3	13	—	100·0	100·0	9	5	4	—	100·0	100·0

TABLE 6·3— *No. of selected participants and the amount of credit obtained from various sources during rabi seasons of* 1966-67 *and* 1967-68

Crop	State	Agency	Kharif 1966-67				Rabi 1966-67			
			H. Y. crops		All crops		H. Y. crops		All crops	
			No.	Amt.	No.	Amt.	No.	Amt.	No.	Amt.
1	2	3	4	5	6	7	8	9	10	11
Paddy	A. Pradesh	Block/Dept.	—	—	—	—	—	—	—	—
		Cooperative	2	857	20	21,115	—	—	6	7,910
		All agencies	2	857	20	21,115	—	—	6	7,910
	Kerala	Cooperative	2	600	12	7,130	1	200	9	4,900
	Madras	Block/Dept.	—	—	—	—	—	—	1	130
		Cooperative	—	—	3	1,400	—	—	2	1185
		All agencies	—	—	3	1,400	—	—	3	1,315
	Mysore	Cooperative	1	100	6	5,450	1	200	—	—
	Orissa	Cooperative	7	2,088	—	—	10	3,971	—	—
	W. Bengal	Block/Dept.	—	—	1	100	—	—	3	900
	All States	Block/Dept.	—	—	1	100	—	—	4	1,030
		Cooperative	12	3,645	41	35,095	12	4,371	17	13,995
		All agencies	12	3,645	42	35,195	12	4,371	21	15,025
Jowar	Maharashtra	Cooperative	—	—	19	57,758	1	2,400	26	116,716
	Mysore	Cooperative	1	1,852	1	650	2	1,473	1	300
	All States	Cooperative	1	1,852	20	6,408	3	3,873	27	1,17,016

TABLE 6·3—(*Contd.*)

Crop	State	Agency	Kharif 1967-68				Rabi 1967-68			
			H.Y. crops		All crops		H.Y. crops		All crops	
			No.	Amt.	No.	Amt.	No.	Amt.	No.	Amt.
1	2	3	12	13	14	15	16	17	18	19
Paddy—	A. Pradesh	Block/Dept.	—	—	4	1,000	—	—	—	—
		Cooperative	1	355	21	19,475	1	250	11	11,750
		All agencies	1	355	22	20,475	1	250	11	11,750
	Kerala	Cooperative	1	126	14	8,164	—	—	6	3,680
	Madras	Block/Dept.	2	260	3	160	—	—	—	—
		Cooperative	—	—	—	—	—	—	3	2,500
		All agencies	2	260	3	160	—	—	3	2,500
	Mysore	Cooperative	—	—	15	8,515	—	—	1	150
	Orissa	Cooperative	9	4,488	—	—	15	7,832	—	—
	W. Bengal	Block/Dept.	—	—	2	350	—	—	1	80
		Cooperative	—	—	1	100	—	—	1	200
	ALL STATES	Block/Dept.	—	—	6	1,510	—	—	1	80
		Cooperative	11	4,969	51	36,254	16	8,082	22	18,280
		All agencies	11	4,969	57	37,764	16	8,082	23	18,360
Jowar—	Maharashtra	Cooperative	—	—	16	39,492	4	3,440	26	1,01,728
	Mysore	Cooperative	—	—	7	2,600	13	14,186	4	5,300
	ALL STATES	Cooperative	—	—	23	42,092	17	17,626	30	1,07,028

Table 7·1—*Percentage of cultivators adopting the H. Y. varieties in Rabi 1967-68 by size of operational holding*

Crop	State	Size of operational holding group						
		Below 2·5 acres	2·5—5·0 acres	5·0—10·0 acres	10·0—20·0 acres	20 0—50·0 acres	50·0 acres & above	All sizes
1	2	3	4	5	6	7	8	9
Paddy—	A. Pradesh	2·25	5·31	15·56	29·22	54·79	45·45	10·87
	Madras	34·01	46·75	47·37	30·00	N.R.	N.R.	39·96
	Kerala	Nil	1·48	1·84	13·16	58·33	N.R.	4·35
	Orissa	18·85	25·15	62·50	61·54	85·71	100·00	32·01
	Mysore	36·36	25·00	44·12	60·00	50·00	N.R.	42·50
	W. Bengal	24·10	27·78	53·85	66·67	N.R.	N.R.	27·76
	ALL STATES	11·90	18·40	28·21	31·36	57·29	50·00	19·02
Jowar—	Maharashtra	4·40	6·35	4·83	11·03	22·30	30·56	9·76
	Mysore	12·50	16·67	28·89	31·11	48·65	60·00	35·19
	ALL STATES	4·79	6·97	8·28	13·96	27·84	39·22	13·15

TABLE 7·2—*Percentage of selected participants adopting H.Y. varieties during the Rabi season.*

Crop	State/Size Group	Total participants in Rabi 1967-68	Participants adopting for first time in Rabi seasons	Percentage distribution of the participants adopting for first time in Rabi season by years			
				1965-66	1966-67	1967-68	Total
1	2	3	4	5	6	7	8
Paddy—	Andhra Pradesh	67	51	3·92	11·76	84·32	100·00
	Kerala	23	9	—	55·56	44·44	100·00
	Madras	32	16	—	—	100·00	100·00
	Mysore	24	—	—	—	—	0·00
	Orissa	35	31	—	87·10	12·90	100·00
	West Bengal	55	52	—	3·85	96·15	100·00
	ALL STATES	236	159	1·26	25·16	73·58	100·00
	Size Group—Below 2·5 acres	65	55	—	12·73	87·27	100·00
	2·5 to 5 acres	43	27	—	25·92	74·08	100·00
	5·0 to 10 acres	61	40	2·50	27·50	70·00	100·00
	10 to 20 acres	37	24	4·17	37·50	58·33	100·00
	20 to 50 acres	26	10	—	40·00	60·00	100·00
	50 acres and above	4	3	—	66·67	33·33	100·00
Jowar—	Maharashtra	55	55	1·82	1·82	96·34	100·00
	Mysore	31	19	—	31·57	68·43	100·00
	ALL STATES	86	74	1·35	9·46	89·19	100·00
Size Group—Below 2·5 acres		5	4	—	—	100·00	100·00
	2·5 to 5·0 acres	7	6	—	—	100·00	100·00
	5·0 to 10·0 acres	14	11	—	90·91	9·09	100·00
	10·0 to 20·0 acres	21	19	—	5·26	94·74	100·00
	20·0 to 50·0 acres	27	25	—	12·00	88·00	100·00
	50·0 acres and above	12	9	11·11	22·22	66·67	100·00

TABLE 7·3 :— *Average area under the H.Y. Varieties per selected participant and its proportion to average gross cropped area for the Rabi of* 1966-67 *and* 1967-68.

Crop	State/Size-group	Average area under H.Y.V. in acres 1966-67 Rabi	Average area under H.Y.V. in acres 1967-68 Rabi	Percentage of area under H. Y. V. to gross cropped area in 1966-67 Rabi	Percentage of area under H. Y. V. to gross cropped area in 1967-68 Rabi
1	2	3	4	5	6
Paddy	Andhra Pradesh	2·01	5·58	15·46	35·95
	Kerala	0·96	0·94	12·36	12·55
	Madras	0·05	0·95	6·02	77·87
	Mysore	0·69	1·55	30·94	70·14
	Orissa	1·12	1·32	33·63	34·55
	West Bengal	0·02	0·73	50·00	100·00
	All States	0·91	2·30	17·11	36·68
	Size group: Below 2·5 acres	0·09	0·51	19·15	63·75
	2·5 to 5·0 acres	0·24	1·20	20·00	64·52
	5·0 to 10·0 acres	0·49	1·38	15·26	37·70
	10·0 to 20·0 acre	0·94	1·91	16·35	28·68
	20·0 to 50·0 acres	2·33	5·25	15·66	29·43
	50·0 acres and above	19·00	42·75	19·59	40·14
Jowar	Maharashtra	0·01	1·03	0·14	15·01
	Mysore	0·17	1·18	3·01	17·25
	All States	0·08	1·10	1·23	16·06
	Size Group: Below 2·5 acres	0·00	0·76	0·00	79·17
	2·5 to 5·0 acres	0·11	1·10	7·19	58·20
	5·0 to 10·0 acres	0·14	1·18	7·33	40·41
	10·0 to 20·0 acres	0·02	0·57	0·51	18·75
	20·0 to 50·0 acres	0·07	0·98	0·93	12·79
	50·0 acres and above	0·14	2·00	0·96	12·34

TABLE 7·4 :— *Distribution of respondents by the agency approaching them for* ***taking up***

Crop	State	Distribution by the agency approaching										Total
		V.L.W.	Office bearers of Co-operative/ Panchayat	Progressive cultivator	Other cultivators in the village	None but took it up on his own having seen demonstrations	Adopted only on the basis of printed literature Radio programme	A.E.O.	B.D.O.	D.A.O.	Others	
1	2	3	4	5	6	7	8	9	10	11	12	13
Paddy	A. Pradesh	35	1	6	1	1	3		—	—	17	67
	Kerala	13	—	—	1	—	9		—	—	—	23
	Madras	10	2	8	12	—	—	—	—	—	—	32
	Mysore	11	—	1	5	—	2	—	—	—	5	24
	Orissa	23	—	2	2	4	1	—	—	—	3	35
	W. Bengal	36	2	2	13	1	—	—	—	—	1	55
	All States	128 (54·24)	5 (2·12)	19 (8·05)	34 (14·41)	6 (2·54)	15 (6·35)	3 (1·27)	—	—	26 (11·01)	236
Jowar	Maharashtra ..	27	4	—	—	—	3	—	—	—	21	55
	Mysore	12	1	3	4	1	—	—	1	1	8	31
	All States	39 (45·35)	5 (5·81)	3 (3·49)	4 (4·65)	1 (1·16)	3 (3·49)		1 (1·16)	1 (1·16)	29 (33·72)	86

TABLE 7·5:—*Distribution of respondents who have seen trials/demonstrations by the year of seeing and where seen*

Crop	State	Total No. reporting seing	1965-66*					1966-67					1967-68				
			Total	A	B	C	D	Total	A	B	C	D	Total	A	B	C	D
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Paddy	A. Pradesh ..	23	7	2	5	—	—	21	9	12	—	—	7	3	4	—	—
	Kerala	5	1	1	—	—	—	—	—	—	—	—	5	1	4	—	—
	Madras	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Mysore	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Orissa	29	7	4	—	3	—	28	15	9	4	—	1	1	—	—	—
	W. Bengal	14	—	—	—	—	—	8	—	—	7	1	12	6	—	6	—
	All States	71	15	7	5	3	—	57	24	21	11	1	25	11	8	6	—
Jowar	Maharashtra ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Mysore	15	—	—	—	—	—	15	11	10	—	1	4	2	2	—	—
	All States	15	—	—	—	—	—	15	11	10	—	1	4	2	2	—	—

*No Demonstrations reported before 1965-66.

A=Fellow cultivator.
B=Progressive cultivator and Regd. grower.
C=Seed Farm.
D=Others.

Table 7·6:—*Distribution of plots by no. of ploughings depth of ploughing and use of improved practices*

Crop	State/sizegroup	Total No. of plots	Distribution of plots by type of equipment used and the no. of ploughings done													
			Tractor ploughing	Iron plough			Desi plough				Distribution of plots by depth of ploughing			Plots reporting		
				Less than 4 times	4 times or more	Total	Less than 4 times	4—6 times	More than 6 times	Total	Less than 4"	4—5"	above 6"	Use of roller/plank	Adoption of basal application of pesticides	Adopting green manures
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Paddy	A. Pradesh	114	36	—	—	—	61	17	—	78	74	35	5	73	—	5
	Kerala	37	7	—	2	2	1	8	19	28	11	16	10	30	—	21
	Madras	43	—	—	2	2	—	13	28	41	43	—	—	42	—	12
	Mysore	26	—	9	—	9	15	2	—	17	—	25	1	25	—	1
	Orissa	50	—	—	—	—	38	12	—	50	26	24	—	50	—	—
	W. Bengal ..	137	—	—	—	—	74	63	—	137	137	—	—	—	—	—
	All States ..	407	43	9	4	13	189	115	47	351	291	100	16	220	—	39
Size group	Below 2·5 acres..	102	3	—	—	—	48	42	9	99	93	9	—	30	—	3
	2·5 to 5·0 acres	74	—	2	2	4	37	19	14	70	57	17	—	40	—	9
	5·0 to 10·0 acres	112	3	4	2	6	54	32	17	103	74	34	4	66	—	12
	10·0 to 20·0 acrs	48	8	—	—	—	27	9	4	40	27	20	1	29	—	6
	20·0 to 50·0 acres	42	17	3	—	3	14	5	3	22	12	19	11	32	—	9
	50·0 acres & above.	29	12	—	—	—	9	8	—	17	28	1	—	23	—	—
Jowar	Maharashtra ..	56	5	46	—	46	1	—	—	1	—	25	27	47	1	—
	Mysore	35	—	1	—	1	31	1	—	32	—	25	8	15	21	—
	All States ..	91	5	47	—	47	32	1	—	33	—	50	35	62	22	—
Size group	Below 2·5 acres.	5	—	4	—	4	1	—	—	1	—	4	1	3	—	—
	2·5 to 5·0 acres.	8	1	3	—	3	1	1	—	2	—	3	3	7	1	—
	5·0 to 10·0 acres.	14	—	9	—	9	2	—	—	2	—	8	3	9	2	—
	10·0 to 20·0 acres.	23	2	12	—	12	9	—	—	9	—	11	12	13	6	—
	20·0 to 50·0 acres	27	—	15	—	15	11	—	—	11	—	17	9	18	6	—
	50·0 acres. and above	14	2	4	—	4	8	—	—	8	—	7	7	12	7	—

TABLE 7·7:—*Distribution of plots according to basal doses of fertilizers by size-group*

(Qty in Rabi)

Crop	State/Size group	Total No. of plots	Plots where ferti-lizers were not used at all	Distribution of plots according to doses of fertilizers manures applied									
				"N" in terms of Am. Sulphate in kg. per acre.					"P_2O_5" in terms of S. Phosphate in kg. per acre				
				Less than 70	70-99	100-149	150 & above	Av. dose	Less than 70	70-99	100-149	150 P above	Av. dose
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Paddy	A. Pradesh	114	10	30	20	37	5	85·1	22	8	43	24	109·9
	Kerala	37	12	1	2	7	2	118·2	—	1	4	5	137·3
	Madras	43	30	—	1	—	—	84·6	—	—	—	—	0·0
	Mysore	26	12	3	2	—	1	69·2	3	—	4	3	106·6
	Orissa	50	9	19	9	9	—	66·4	19	2	15	1	79·5
	W. Bengal	137	7	43	26	36	17	93·2	59	4	1	14	69·8
	All States	407	80	96	60	89	25	84·2	103	15	67	47	105·3
Size group	Below 2·5 acres ..	102	28	29	8	19	6	77·6	19	3	3	4	78·7
	2·5 to 5·0 ,, ..	74	21	11	14	11	6	91·4	26	3	5	9	100·3
	5·0 to 10·0 ,, ..	112	19	33	13	19	11	74·3	35	3	17	10	85·6
	10·0 to 20·0 ,, ..	48	10	7	12	8	—	81·9	17	3	7	4	82·3
	20·0 to 50·0 ,, ..	42	2	10	5	17	2	88·6	5	3	22	5	104·4
	50·0 acrs & above ..	29	—	6	8	15	—	85·0	1	—	13	15	123·5
Jowar	Maharashtra ..	56	13	2	—	3	1	76·3	1	—	—	—	60·5
	Mysore	35	10	8	5	5	6	84·8	5	6	4	7	95·0
	All States	91	23	10	5	8	7	82·2	6	6	4	7	86·3
Size group	Below 2·5 acres ..	5	3	—	—	—	—	0·0	—	—	—	—	0·0
	2·5 to 5·0 ,, ..	8	3	—	—	1	1	140·0	—	—	—	1	200·0
	5·0 to 10·0 ,, ..	14	3	2	—	1	1	64·1	2	—	—	1	63·7
	10·0 to 20·0 ,, ..	23	5	2	2	1	3	116·8	—	2	3	2	127·6
	20·0 to 50·0 ,, ..	27	6	3	1	4	1	93·3	2	1	1	1	83·8
	50·0 acre & above ..	14	3	3	2	1	1	71·3	2	3	—	2	84·1

TABLE 7·7—(*contd.*)

(Qty. in Kg.)

Crop	State/size group	Total No. of plots	Plots where fertilizers were not used at all	Distribution of plots according to doses of fertilizers manures applied											
				"K"in terms of M.P. per acre					GRADES						
				Less than 30	30-40	41-50	51 Kg. & above	Av. dose	No using exclusively	No. of plots on which used	Less than 70	70—99	100-149	150 & above	Av. dose
1	2	3	4	15	16	17	18	19	20	21	22	23	24	25	26
Paddy	A. Pradesh	114	10	7	—	—	—	18·7	3	10	6	1	3	—	53·3
	Kerala	37	12	—	2	3	4	62·8	6	8	1	1	2	4	123·0
	Madras	43	30	—	—	—	—	0·0	12	12	3	6	2	1	91·9
	Mysore	26	12	1	—	—	—	12·5	1	3	2	—	1	—	43·6
	Orissa	50	9	11	7	3	1	31·1	—	—	—	—	—	—	0·0
	W. Bengal	137	7	28	16	23	12	34·1	—	2	2	—	—	—	54·5
	All States	407	80	47	25	29	17	31·2	22	35	14	8	8	5	74·3
Size	Below 2·5 acres. ..	102	28	12	4	9	6	33·3	3	4	3	1	—	—	32·9
groups	2·5 to 5·0 acres. ..	74	21	10	6	2	8	37·5	6	8	3	3	2	—	72·8
	5·0 to 10·0 acres ..	112	19	9	9	12	2	36·0	7	10	2	3	4	1	99·2
	10·0 to 20·0 acres ..	48	10	13	2	1	—	21·2	3	6	4	1	—	1	62·9
	20·0 to 50·0 acres ..	42	2	3	4	5	1	31·4	3	7	2	—	2	3	75·8
	50·0 acres & above ..	29	—	—	—	—	—	0·0	—	—	—	—	—	—	0·0
Jowar	Maharashtra	56	13	—	—	—	—	0·0	37	38	1	—	22	15	134·0
	Mysore	35	10	15	—	1	1	36·8	1	2	—	2	—	—	83·3
	All States	91	23	15	—	1	1	36·8	38	40	1	2	22	15	127·2
Size	Below 2·5 acres ..	5	3	—	—	—	—	0·0	2	2	—	—	1	1	175·0
groups	2·5 to 5·0 acres. ..	8	3	1	—	—	—	6·6	3	3	—	—	2	1	138·8
	5·0 to 10·0 acres ..	14	3	1	—	—	1	89·1	7	8	—	1	3	4	120·9
	10·0 to 20·0 acres. ..	23	5	2	—	1	—	29·0	10	10	—	—	6	4	137·6
	20·0 to 50·0 acres ..	27	6	5	—	—	—	23·5	12	13	1	1	8	3	116·5
	50·0 acres & above ..	14	3	6	—	—	—	21·6	4	4	—	—	2	2	135·7

TABLE 7·81 *Distribution of nurseries by method of raising seed bed and taking of plant protection measures*

State/Size Group	Nurseries on raised seed beds					Nurseries on traditional seed beds.				
	Total No.*	No taking P.P. Measures during				Total No.*	No taking P.P. Measures during			
		0—10 days	11—17 days	18—24 days	24 days & above		0—10 days	11—17 days	18—24 days	24 days & above
1	2	3	4	5	6	7	8	9	10	11
A. Pradesh	6	2	4	4	—	56	37	34	17	5
Kerala	13	4	6	2	—	13	3	4	2	4
Madras	3	—	2	—	—	30	—	1	1	—
Mysore	8	—	—	5	—	17	—	3	2	—
Orissa	1	—	1	1	—	32	—	10	—	—
West Bengal	1	—	—	—	—	66	—	5	4	13
All States	32	6 (18·75)	13 (40·63)	12 (37·5)	—	214	40 (18·69)	57 (26·64)	26 (12·15)	22 (10·28)
Size group										
Below 2·5 acres.	—	—	—	—	—	54	3	3	2	3
2·5 to 5·0 ,,	8	—	5	3	—	36	5	6	2	—
5·0 to 10·0 ,,	7	3	2	1	—	62	9	22	7	13
10·0 to 20·0 ,,	6	2	2	2	—	33	9	12	4	2
20·0 to 50·0 ,,	11	1	4	6	—	21	10	9	4	4
50·0 acres. & above	—	—	—	—	—	8	4	5	7	—

*All the nurseries reported application of chemical fertilizers.

TABLE 7·9 : *Distribution of plots by the age of plants at the time of transplanting, distance between rows, plants*

Crop	State/Size Group	Total No of plots	Age at the time of transplanting			Plots reporting distance between rows			Plots reporting distance between plants.		
			Below 20 days	20—34 days	35 days & above	Below 6″	6″—9″	9″ & above	Below 4″	4″—6″	6″ & above
1	2	3	4	5	6	7	8	9	10	11	12
Paddy	A. Pradesh ..	114	—	108	6	3	10	—	13	67	—
	Kerala	37	—	30	4	—	2	—	—	23	11
	Madras	43	—	40	2	—	6	—	—	41	1
	Mysore	26	—	24	1	—	2	—	—	4	21
	Orissa	50	—	41	2	—	—	—	—	—	—
	W. Bengal	137	—	50	87	25	112	—	—	91	46
	All States	407	—	293	102	28	132	—	13	226	79
Size Group											
	Below 2·5 acs. ..	102	—	53	45	9	56	—	1	67	21
	2·5 to 5·0 ..	74	—	57	15	6	26	—	—	39	19
	5·0 to 10·0 ..	112	—	75	32	7	41	—	—	57	27
	10·0 to 20·0 ..	48	—	40	7	6	7	—	—	24	7
	20·0 to 50·0 ..	42	—	39	3	—	2	—	—	22	5
	50·0 acs. & above	29	—	29	—	—	—	—	12	17	—

TABLE 7·10 : *Distribution of sowing of hybrid jowar according to seed rate and method of sowing*

State/Size Group	Seed rate used			Depth of seed drilling			Average depth in inches
	Below recom-mended	Recom-mended	Above recom-mended	1″	2″—3″	More than 3″	
1	2	3	4	5	6	7	8
Maharashtra	51	3	2	—	54	2	2·50
Mysore	31	1	—	—	21	11	3·18
All States	82	4	2	—	75	13	2·75
Size Group							
Below 2·5 acs.	5	—	—	—	5	—	2·20
2·5 to 5·0	8	—	—	—	7	1	2·87
5·0 to 10·0	13	—	1	—	13	1	2·56
10·0 to 20·0	18	3	—	—	17	4	2·85
20·0 to 50·0	25	1	1	—	23	4	2·81
50·0 acs. & above	13	—	—	—	10	3	2·76

TABLE 7·11 : *Distribution of plots by the adoption of intercultural operations*

Crop	State/Size Group	Total plots on which interculture was adopted	Type of equipment used			Intervals at which operation done				Quantity used				
			Hand weeding	Use of push hoe	Cultivator used	15-30 days		31-60 days		Below 50 kg.	51-75 kg.	76-100 kg.	100 kg.& above	Ave. dose
						Once	More than twice	Once	More than twice					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Paddy ..	A. Pradesh ..	111	111	—	—	80	27	3	1	8	9	26	67	133·49
	Kerala ..	34	33	1	—	19	15	—	—	4	9	11	5	98·64
	Madras ..	40	40	—	—	33	4	3	—	5	18	9	4	70·80
	Mysore ..	24	23	1	—	13	1	9	1	—	3	4	16	177·32
	Orissa ..	27	27	—	—	23	—	4	—	1	17	2	5	69·95
	W. Bengal ..	130	122	8	—	123	—	3	4	33	54	17	7	58·60
	All States ..	366	356	10	—	291	47	22	6	51	110	69	104	122·93
Size Group	Below 2·5 acs. ..	93	93	—	—	87	2	4	—	19	33	16	10	78·64
	2·5 to 5·0 acs.. ..	68	68	—	—	57	6	4	1	10	25	14	8	90·66
	5·0 to 10·0 acs...	91	81	10	—	64	16	7	4	15	29	13	29	118·59
	10·0 to 20·0 acs...	44	44	—	—	31	9	4	—	2	16	8	18	122·93
	20·0 to 50·0 acs ..	41	41	—	—	24	13	3	1	4	7	18	11	102·40
	50·0 acs. and above ..	29	29	—	—	29	1	—	—	1	—	—	28	155·46
Jowar ..	Maharashtra ..	56	56	—	—	34	20	4	—	—	14	16	19	99·65
	Mysore ..	34	2	—	32	20	5	3	6	—	7	8	13	126·16
	All States ..	90	58	—	32	54	25	7	6	—	21	24	32	111·81
Size Group	Below 2·5 acs. ..	4	4	—	—	2	2	—	—	—	1	1	2	119·64
	2·5 to 5·0 acs. ..	8	6	—	2	2	3	3	—	—	—	3	3	127·55
	5·0 to 10·0 acs. ..	14	10	—	4	7	5	—	2	—	2	6	3	104·34
	10·0 to 20·0 ..	23	14	—	9	16	5	1	1	—	3	10	9	161·58
	20·0 to 50·0 acs...	27	18	—	9	16	7	2	2	—	9	3	8	110·03
	50·0 acs. and above ..	14	6	—	8	9	3	1	1	—	6	1	7	94·25

TABLE 7·12 : *Distribution of participants adopting preventive and curative plant protection measures*

Crop	State	No. of participants	Preventive measures				Curative measures					
			No. reporting any P.P. measure	Distribution (gross) of types of measures taken			No. reporting Pests/ diseases	No. taking curative measures	No. of cases of treatment according to effectiveness			Total
				Soil treatment	Seed Seedling, treatment	Spraying dusting			Effective	Partially effective	In-effective	
1	2	3	4	5	6	7	8	9	10	11	12	13
Paddy	A. Pradesh	67	43(64·18)	—	8	74	32(47·76)	31(96·88)	35(57·38)	22(36·06)	4(6·56)	61
	Kerala	23	16(69·57)	—	—	20	10(43·48)	9(90·00)	7(70·00)	3(30·00)	—	10
	Madras	32	9(28·13)	—	—	10	20(62·50)	8(40·00)	4(50·00)	2(25·00)	2(25·00)	8
	Mysore	24	10(41·67)	—	1	12	6(25·00)	6(100·00)	1(11·11)	8(88·89)	—	9
	Orissa	35	6(17·14)	—	1	9	3(8·57)	1(33·33)	2(100·00)	—	—	2
	W. Bengal	55	37(67·27)	—	—	49	13(23·64)	13(100·00)	13(86·67)	2(13·33)	—	15
	All States	236	121(51·27)	—	10	174	84(35·59)	68(80·95)	62(59·05)	37(35·24)	6(5·71)	105
Jowar	Maharashtra	55	44(80·00)	—	1	50	24(43·64)	24(100·00)	10(37·04)	14(51·85)	3(11·11)	27
	Mysore	31	14(45·16)	12	—	20	29(93·55)	19(65·52)	18(50·00)	9(25·00)	9(25·00)	36
	All States	86	58(67·44)	12	1	70	53(61·63)	43(81·13)	28(44·44)	23(36·51)	12(19·05)	63

NOTE : Figures in brackets in cols. 4 and 8 are percentages to col. 3; in col. 9 to col. 8 and cols. 10, 11. and 12 to col. 13.

TABLE 7·13 : *Percentage distribution of plots by irrigation sources and extent of irrigation*

Crop	State	Canals			Wells with oil engines motors etc.			Other wells			Tanks, etc.			All sources		
		Ex-cess	Defi-cient	Normal	Ex-cess	Defi-cient	Normal	Ex-cess	Defi-cient	Normal	Ex-cess	Defi-cient	Normal	Ex-cess	Defi-cient	Normal
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Paddy	A. Pradesh	—	6·67	89·17	—	—	4·17	—	—	—	—	—	—	—	6·67	93·33
	Kerala	—	28·95	39·47	—	10·53	2·63	—	—	—	—	18·42	—	—	57·89	42·11
	Madras	—	—	—	—	33·33	31·11	—	6·67	28·89	—	—	—	—	40·00	60·00
	Mysore	—	—	100·00	—	—	—	—	—	—	—	—	—	—	—	—
	Orissa	2·00	2·00	96·00	—	—	—	—	—	—	—	—	—	2·00	2·00	96·00
	W. Bengal	—	20·22	58·43	—	—	—	—	—	—	—	5·62	15·73	—	25·84	74·16
	All States	0·27	10·35	67·30	—	5·18	5·55	—	0·82	3·54	—	3·27	3·81	0·27	19·62	80·11
Jowar	Maharashtra	—	7·41	38·89	—	1·85	35·18	—	—	5·56	—	1·85	9·26	—	11·11	88·89
	Mysore	2·86	8·57	88·57	—	—	—	—	—	—	—	—	—	2·86	8·67	88·57
	All States	1·12	7·87	58·43	—	1·12	21·35	—	—	3·37	—	1·12	5·62	1·12	10·11	88·77

TABLE 7·14 : *Distribution of participants by adoption of recommended practices in combinations (A—Seed treatment; B—use of chemical fertilizers; C—Preventive plant protection; and D—Inter-culture operation)*

Crop	State/Size Group	Total partici-pants	Percentage distribution by various specified combination of practices										
			All the four	Any one of the four	None of the four	B,C&D in combi-nation	Any three in other combi-nation	B &D in combi-nation	Any two in other combi-nation	Using any chemi-cal fertili-zers	N+P +K	N+P	N+K
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Paddy ..	A. Pradesh ..	67	52·2	1·5	4·5	22·4	1·5	17·9	—	95·6	10·5	70·2	—
	Kerala ..	23	47·8	8·7	—	17·4	21·7	4·4	—	87·0	30·4	4·4	—
	Madras ..	32	—	12·5	—	28·1	—	59·4	—	93·8	—	—	—
	Mysore ..	24	20·8	—	4·2	20·8	8·3	41·7	4·2	95·8	—	37·5	4·2
	Orissa ..	35	2·9	22·9	17·1	8·6	—	40·0	8·6	80·0	37·1	25·7	—
	W. Bengal ..	55	41·8	1·8	—	25·5	20·0	3·6	7·3	92·7	30·9	10·9	14·6
	All States ..	236	31·8	6·8	4·2	21·2	8·1	24·6	3·4	91·5	18·6	30·5	3·8
Size Group ..	Below 2·5 acs. ..	65	23·1	6·2	6·2	18·5	9·2	30·8	6·2	87·7	10·8	16·9	9·2
	2·5 to 5·0 acs. ..	43	25·6	7·0	4·7	18·6	4·7	37·2	2·3	90·7	20·9	25·6	—
	5·0 to 10·0 acs. ..	61	24·6	8·2	4·9	29·5	11·5	18·0	3·3	91·8	19·7	32·8	1·6
	10·0 to 20·0 acs. ..	37	35·1	8·1	2·7	18·9	10·8	21·6	2·7	91·9	24·3	32·4	2·7
	20·0 to 50·0 acs. ..	26	65·4	3·8	—	19·2	—	11·5	—	100·0	26·9	53·8	3·8
	50·0 acs. and above ..	4	100·0	—	—	—	—	—	—	100·0	—	100·0	—
Jowar ..	Maharashtra ..	55	81·8	—	—	—	13·9	—	36·4	94·0	—	1·3	—
	Mysore ..	31	54·8	—	—	—	32·3	—	12·9	87·1	45·2	12·9	3·2
	All States ..	86	72·1	—	—	—	20·9	—	7·0	91·9	16·3	5·8	1·2
Size Group ..	Below 2·5 acs. ..	5	80·0	—	—	—	20·0	—	—	100·0	—	—	—
	2·5 to 5·0 acs. ..	7	57·1	—	—	—	28·6	—	14·3	71·4	14·3	—	—
	5·0 to 10·0 acs. ..	14	71·4	—	—	—	21·4	—	7·1	92·9	14·3	7·1	—
	10·0 to 20·0 acs. ..	21	76·2	—	—	—	19·0	—	4·8	95·2	14·3	9·5	—
	20·0 to 50·0 acs. ..	27	66·7	—	—	—	22·2	—	11·1	88·9	14·8	3·7	3·7
	50·0 acs. & above ..	12	83·3	—	—	—	16·7	—	—	100·0	33·3	8·3	—

TABLE 8·1 : *Average cash expenditure on inputs (in Rs.) per acre for H. V. and non-HV holdings of the participants, crop-wise*

Crop	State	Average cost per acre for the holding on													
		Seed		Fertiliser		Plant protection measures		Labour charges		Irrigation		Other costs		Total costs	
		HV holding	Other holding	HV holding	Other holding	HV holding	Other holding	HV holding	Other holding	HV holding	Other holding	HV holding	Other holding	HV holding	Other holding
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Paddy ..	A. Pradesh	12·99	6·35	139·31	25·18	17·04	2·79	150·18	41·40	5·32	1·94	3·74	0·56	328·62	78·24
	Kerala	18·52	0·30	204·24	56·78	9·44	1·75	182·02	94·74	13·65	7·24	18·29	30·95	446·18	191·78
	Madras	10·57	9·85	111·92	10·47	5·76	0·63	107·31	15·05	—	—	27·23	8·31	262·81	44·32
	Mysore	4·21	0·34	167·45	47·73	14·12	0·10	118·55	22·66	17·07	12·34	55·73	—	377·15	83·19
	Orissa	9·94	0·92	135·57	21·93	2·28	0·20	99·43	26·63	7·96	2·21	15·22	2·87	270·42	54·79
	W. Bengal	26·38	7·14	148·19	16·26	19·17	2·25	170·35	7·89	8·48	1·24	1·25	0·51	373·86	35·31
	All States	13·29 (3·99)	4·40 (4·82)	144·36 (43·30)	31·04 (34·02)	14·04 (4·21)	1·93 (2·12)	142·34 (42·70)	43·69 (47·89)	7·14 (2·14)	3·70 (4·06)	12·25 (3·67)	6·46 (7·08)	333·43	91·24
Jowar	Maharashtra	19·79	2·10	128·36	72·78	35·62	1·11	178·97	72·82	2·64	15·60	41·50	14·12	406·91	178·56
	Mysore	24·14	3·14	170·26	7·00	43·02	0·31	70·45	10·63	1·77	0·11	30·76	2·24	340·43	23·47
	All States	21·82 (5·80)	2·47 (2·00)	147·90 (39·35)	49·50 (40·03)	39·07 (10·39)	0·83 (0·67)	128·36 (34·16)	50·82 (41·09)	2·24 (5·96)	10·12 (8·18)	36·50 (9·71)	9·92 (8·02)	375·91	123·68

TABLE 8·2 : *Distribution of harvests by per acre/average yields (in quintals) crop-wise*

Crop	State/ Size Group	Total harvests	No. of Harvests with yield				Average yield
			10 or less	10—20	20—30	30—40	
1	2	3	4	5	6	7	8
Paddy	Andhra Pradesh ..	68	20	24	23	1	17·56
	Kerala	22	12	4	5	1	11·01
	Madras	33	16	16	1	—	11·80
	Mysore	24	4	16	4	—	15·79
	Orissa	41	4	11	25	1	21·71
	West Bengal	65	6	45	13	1	17·71
	All States	253	62	116	71	4	17·07
Size Group	Below 2·5 acs. ..	65	16	41	6	2	14·84
	2·5 to 5·0 acs. ..	48	11	20	16	1	17·14
	5·0 to 10·0 acs. ..	69	16	26	26	1	16·75
	10·0 to 20·0 acs. ..	36	8	19	10	—	16·82
	20·0 to 50·0 acs. ..	27	11	9	13	—	17·55
	50·0 acs. & above ..	8	—	1	—	—	18·73
Jowar	Maharashtra	53	36	16	1	—	8·03
	Mysore	31	23	8	—	—	9·83
	All States	84	59	24	1	—	8·87
Size Group	Below 2·5 acs. ..	5	2	3	—	—	11·92
	2·5 to 5·0 acs. ..	7	6	1	—	—	5·68
	5·0 to 10·0 acs. ..	13	8	5	—	—	10·67
	10·0 to 20·0 acs. ..	21	16	5	—	—	7·36
	20·0 to 50·0 acs. ..	26	18	7	1	—	8·38
	50·0 acs. & above ..	12	9	3	—	—	9·46

TABLE 8.3 : *Distribution of harvests by average yields per arce and loss reported due to various causes, crop-wise and variety-wise*

Crop	State	Variety	Total cases of harvests	Average yield per acre	Total reporting loss due to one reason or the other	Loss due to various reasons, the number and percentage loss to crops							
						Lodging		Shedding		Pests & disease		Delayed harvests	
						No.	%loss	No.	%loss	No.	%loss	No.	%loss
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Paddy ..	Andhra Pradesh	Taichung .. Native—1 ..	23	15·61	14	—	—	7	20·14	14	20·93	—	—
		ADT-27 ..	14	8·09	7	2	—	2	0·38	2	18·69	1	15·00
		SR-8	31	21·47	9	—	—	—	—	9	14·93	—	—
		All varieties ..	68	17·56	30	2	—	9	15·52	25	17·56	1	15·00
	Kerala ..	Taichung Native-1 ..	1	4·00	—	—	—	—	—	—	—	—	—
		ADT-27 ..	6	7·44	3	—	—	3	7·00	2	5·25	—	—
		IR-8	14	15·49	2	—	—	2	2·00	1	1·00	—	—
		Others ..	1	3·33	—	—	—	—	—	—	—	—	—
		All varieties ..	22	11·01	5	—	—	5	6·50	3	5·11	—	—
	Madras ..	ADT-27 ..	32	11·52	26	8	17·01	8	5·28	21	20·94	—	—
		IR-8	1	20·00	—	—	—	—	—	—	—	—	—
		All varieties ..	33	11·80	26	8	17·01	8	5·28	21	20·94	—	—
	Mysore ..	Taichung Native-1 ..	23	15·78	4	—	—	—	—	4	14·15	1	10·00
		IR-8	1	16·00	—	—	—	—	—	—	—	—	—
		All varieties ..	24	15·79	4	—	—	—	—	4	14·15	1	10·00
	O rissa ..	Taichung Native-1 ..	32	21·50	—	—	—	—	—	—	—	—	—
		IR-8	9	22·21	—	—	—	—	—	—	—	—	—
		All varieties ..	41	21·71	—	—	—	—	—	—	—	—	—

Paddy ..	W. Bengal ..	Taichung Native-1 ..	31	17·28	15	—	—	11	17·06	5	11·35	—	—
		IR-8	34	17·99	16	—	—	14	10·14	8	7·27	—	—
		All varieties ..	65	17·71	31	—	—	25	13·28	13	8·17	—	—
	All States ..	Taichung Native-1	110	17·11	33	—	—	18	19·40	23	18·96	1	10·00
		ADT-27,	52	9·26	36	10	6·62	13	4·44	25	17·40	1	17·40
		IR-8 ..	90	20·68	27	—	—	16	9·48	18	14·28	—	—
		Others ..	1	3·33	—	—	—	—	—	—	—	—	—
		All varieties ..	253	17·07	96	10	6·62	47	11·97	66	16·71	2	10·78
Jowar ..	Maharashtra	.. .. ..	53	8·03	23	1	6·00	—	—	22	28·93	—	—
	Mysore ..	.. .. ..	31	9·83	29	—	—	..	—	29	27·41	1	—
	All States ..	.. .. ..	84	8·87	52	1	6·00	—	—	51	27·82	1	—

TABLE 8·4 : *Distribution of selected participant cultivators according to problems reported on various aspects of HYVP State-wise crop-wise*

Crop	State	Total participants	No. of participants according to problems reported										
			Seed inadequate & not easily available	Fertiliser supply not timely/inadequate	P. P. materials not easily available	Shortage of water in irrigation sources	Poor germination	Early flowering	Attack of pests/diseases	Credit problems	Labour shortage	Marketing problems	Others
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Paddy	.. Andhra	67	—	1	9	4	5	16	17	6	2	53	6
	Kerala	23	8	—	—	18	—	—	2	—	—	—	1
	Madras	32	—	1	5	8	—	—	19	1	9	14	3
	Mysore	24	—	—	—	6	2	—	5	3	2	—	—
	Orissa	35	10	7	2	—	12	2	21	32	27	6	3
	West Bengal ..	55	1	1	5	9	1	21	11	1	—	—	15
	All States	236	19 (8·1)	10 (4·2)	21 (8·9)	45 (19·1)	20 (8·5)	39 (16·5)	75 (31·8)	43 (18·2)	40 (16·9)	73 (30·9)	28 (11·9)
Jowar	.. Maharashtra ..	55	—	13	—	4	—	—	20	—	11	—	3
	Mysore	31	—	1	—	—	—	—	28	6	—	14	—
	All States	86	—	14 (16·3)	—	4 (4·7)	—	—	48 (55·8)	6 (7·0)	11 (12·8)	14 (16·3)	3 (3·5)

APPENDIX No. 3

Sampling Design

The study is to be organised in a sample of 56 blocks representing the various crops included in the High Yielding Varieties Programme and the various States participating in the Programme. The block sample has been allotted to the various crops and in respect of the each crop to the various States broadly in proportion to the area targets fixed by the Government of India in consultation with the State Governments for the Fourth Plan period. One block has been allotted for every 5 lakh acres approximately and crop State combinations where the target is less than 250,000 acres have been ignored.

As a complete frame of the blocks with the relevant details regarding targetted areas is not available, the sample of blocks has been selected in two stages. At the first stage, the requisite sample of districts for each crop-state combination has been selected with probability proportional to area targetted for the relevant crop. The selection has been made by the method of systematic sampling with probability proportional to size. At the second stage, one block has been selected from each of the selected districts with probability proportional to the area targetted.

In respect of each of the sampled blocks, a list of villages participating in the programme for the relevant crop is to be prepared and a sample of 3 villages in to be selected with probability proportional to area targetted. If the area targetted for 1967-68 are not available or available only for the kharif season but not rabi, the data relating to performance in 1966-67 may be used either in full or in part to cover the rabi season.

In respect of each of the selected villages, a list of cultivator households participating, in the programme for the relevant crop for the year 1967-68 is to be prepared and arranged in the descending order of the size of holding. For this purpose, all households cultivating the relevant crop irrespective of the size of holding and whether cultivation is the households principal occupation or subsidiary, are to be regarded as cultivator households. From the list so prepared, a systematic sample of about 10 households is to be drawn by the method of systematic sampling with equal probability. Cultivators engaged in the cultivation of the relevant crop but not participating in the high yielding varieties programme may be similarly listed in the descending order of the size of holding and a sample of about 5 may be drawn by the method of systematic sampling with equal probability. A sample of three registered growers is also to be selected for each Block corresponding to the three villages selected for study. If the selected village has one or more registered growers, the largest of them may be selected. If there is none in the village, the one available nearest to the village or most concerned with the seed supplies to the village may be taken.

The study for the rabi season was conducted in 15 blocks for wheat covering 6 major wheat growing States. For this study the selection of participants, non-participants and registered growers was attended to as described in the paragraphs above. For the four kharif crop *i.e.* Paddy, Jowar, Maize and Bajra, the study was sought to be continued in the same selected area of kharif study provided there was adequate coverage under the programme. On the above basis the study could be conducted in 10 out of 22 paddy blocks and 4 out of 6 selected jowar blocks. For those two crops a fresh selection of the participants in the villages was made while the study relating to non-participants and registered growers was not repeated.

PROGRAMME EVALUATION ORGANISATION

(Planning Commission)

List of Publications

1. Group Dynamics in a North Indian Village. (1954).
2.* Evaluation Report on First Years' Working of Community Projects (May 1954).
3.* Community Projects—First Reactions. (August 1954).
4. Training of Village Leaders in Bhopal. (September 1954).
5. Cotton Extension in P.E.P.S.U.—A case study. (1955).
6.* Evaluation Report on Second Years' Working of Community Projects (Vols. I & II). (April 1955).
7. Evaluation Report on Second Years' Working of Community Projects (Summary). (April 1955).
8.* Training of Village Artisans in Bihar (May 1955).
9. Leadership and Groups in a South Indian Village (June 1955).
10.* Evaluation Report on Working of Community Projects and N.E.S. Blocks (April, 1956).
11. Evaluation Report on Working of Community Projects and N.E.S. Blocks (April, 1956—Summary).
12.* Bench Mark Survey Report—Batala (Punjab) (February, 1956).
13.* Bench Mark Survey Report—Bhadrak (Orissa) (1956).
14.* Three Years of Community Projects (August 1956).
15. Study of Village Artisans (August 1956).
16.* Bench Mark Survey Report—Kolhapur (Bombay) (July 1956).
17.* Bench Mark Survey Report—Morsi (Madhya Pradesh) (Nov. 1956).
18.* Studies in Cooperative Farming (December 1957).
19. Fourth Evaluation Report on Working of Community Projects and N.E.S. Blocks—Vol. I: (includes studies on, 1. Achievements and Problems of the Community Development Programme, 2. Some aspects of the Community Development Programme) (April 1957).
20.* Fourth Evaluation Report on Working of Community Projects and N.E.S. Blocks—Vol. II: includes studies on, 1. Some Aspects of Social change, 2. Enquiry into coverage by Project Programme (May 1957).
21. Bench Mark Survey Reports—Malavalli (Mysore) and Chalakudy (Kerala), (July 1957).
22. Bench Mark Survey Reports—Banswada (Andhra), Smalkot (Andhra) and Erode (Madras) Blocks, (July 1957).
23.* Bench Mark Survey Reports—Pusa (Bihar), Mohd. Bazar (West Bengal) and Arunachal (Assam) Blocks (July 1957).

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*Out of stock.

24.* Bench Mark Survey Reports—Pounta (Himachal Pradesh), Bhadson (Punjab) and Bhathat (Uttar Pradesh), Blocks (Oct. 1957).

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